DOCUMENT RESUME

ED 445 664 IR 020 262

AUTHOR	Bing, JoAnn Layford
TITLE	Enhancing Teachers' Awareness of Academic Opportunities for K-12 Students by Providing Face-to-Face, Video, and Web-Based Teacher-Peer-Mentoring Programs That Synthesize Instruction and Technology.
PUB DATE	1998-08-00
NOTE	120p.; Ed.D. Practicum Report, Nova Southeastern University.
PUB TYPE	Dissertations/Theses - Practicum Papers (043)
EDRS PRICE	MF01/PC05 Plus Postage.
DESCRIPTORS	*Computer Assisted Instruction; Computer Uses in Education; *Educational Media; Educational Practices; *Educational Resources; *Educational Technology; Instructional Development; *Instructional Materials; Secondary Education; *Teaching Methods; World Wide Web
IDENTIFIERS	*Technology Integration; Web Based Instruction

ABSTRACT

This practicum was designed to enable teachers to revitalize their classroom practice by providing them on-going instruction and peer support. Current methodologies and materials, both to facilitate daily classroom practices and to implement instructional activities, were not being utilized by teachers in the writer's public school district. Students had limited opportunities for breadth and scope as they constructed and demonstrated their knowledge. Many classroom practices and learning activities did not include usage of modern tools. Available electronic research and presentation resources were underutilized by teachers and students. Individuals' skills were developed, instructional resources were provided, and organizational capacity was augmented simultaneously. Bi-weekly and monthly group instruction was reinforced by providing individualized assistance to teachers in daily and weekly classroom projects. Instructional resources provided included: CD-ROM multimedia materials, educational sites and search engines on the Web, class-built Web pages, the school computer facilities and television studio, library resources of CD-ROM database research materials, cam-corders, and a series of Web pages posted monthly. An analysis of the data revealed that teachers increased their use of CD-ROM multimedia materials, educational sites and search engines on the Web, electronic document citation, the library resources of CD-ROM database research materials, and the television studio with their students. Though it was time-intensive, teachers and their classes enjoyed posting Web pages related to class work. Survey instruments, with results, are included in several appendices. (Contains 88 references.) (Author/AEF)

Reproductions supplied by EDRS are the best that can be made
from the original document.

ED 445 664

Enhancing Teachers' Awareness of Academic Opportunities for K-12 Students by Providing Face-to-Face, Video, and Web-based Teacher-Peer-Mentoring Programs That Synthesize Instruction and Technology

by
JoAnn Layford Bing
Cluster ITDE-01

A Practicum Report Presented to
the Ed. D. Program in Instructional Technology and Distance Education
in Partial Fulfillment of the Requirements
for the Degree of Doctor of Education.

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

- This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

- Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

J.L. Bing

Nova Southeastern University
1998

IR020262

BEST COPY AVAILABLE

Enhancing Teachers' Awareness of Academic Opportunities for K-12 Students by Providing Face-to-Face, Video, and Web-based Teacher-Peer-Mentoring Programs That Synthesize Instruction and Technology

by
JoAnn Layford Bing
Cluster ITDE-01

A Practicum Report Presented to
the Ed. D. Program in Instructional Technology and Distance Education
in Partial Fulfillment of the Requirements
for the Degree of Doctor of Education

Nova Southeastern University
1998

PRACTICUM APPROVAL PAGE

This practicum took place as described.

Verifier: ________________________

Albert R. Neuner

Assistant Superintendent for Business
Port Jefferson Schools
Scraggy Hill Road
Port Jefferson, New York, 11777

June 18, 1998

This practicum report was submitted by JoAnn Layford Bing under the direction of the adviser listed below. It was submitted to the Ed.D. Program in Instructional Technology and Distance Education and approved in partial fulfillment of the requirements for the degree of Doctor of Education at Nova Southeastern University.

Approved:

________________________ ________________________

Date of Final Approval of Report Joan M. Mignerey, Ph.D., Adviser

ACKNOWLEDGMENTS

Lao Tzu claimed "A journey of a thousand miles begins with a single step" (Heider, 1986, p. 127), and as I come to the end of this journey my appreciation and thanks go to the countless individuals who helped me every step of the way. First, thanks must go to my beloved mother, Christine C. Layford, who passed away on February 14, 1997. She encouraged me to begin this journey and illuminated my steps.

Next, thanks go to the teachers, staff, and students in my workplace with whom I've had the good fortune to travel during implementation. My appreciation also goes to the current and former superintendents, Frank Carasiti and Wayne Jones; Al Neuner, the Assistant to the Superintendent for Business, current and former high school principals, Raymond Sommerstad and Lynne Schwartz, and current administrators, and Board of Education members for their permission and support to proceed.

All of the master teachers who shared their expertise and made presentations during the graduate/in-service course and Teachers Helping Teachers smoothed the path for learners, Mike Slavin, Rich Trifari, Al Watkins, Elizabeth Bauer, Ed Brooks, and, most particularly, my dear friend and colleague, Roxanne Keefer-Mollo. The literary and organizational muses, Mary Linton, Arleen Peck, and Kate Gilmore, helped me through the thickets of organization, syntax, diction, and context; I am eternally grateful to all of them. Thanks to two outstanding students, Tomasz Gajewski, and Sangraal Aiken, and staff members, Jeff Carroll, Peter Jordan, and Rob Udovich who helped to build the cyber-roads the Web Wanderers trod.

I also extend appreciation to Nova professors, most particularly my adviser, Dr. Joan Mignerey, my technology representative, Sue Spahn, and my cluster coordinator, Dr. Marsha Burmeister, and Cluster 62 Nova Southeastern graduate, Dianna K. Decker for providing me a map of the territory and the skills to understand the terrain. All of my ITDE #1 clustermates gladdened my heart and lightened my burden as they trod similar routes; for them, particularly Michael Hutton, and most especially, Susanne Flannelly, and their camaraderie as we blazed the trails together; I count myself fortunate.

Next, thanks go to Dr. Kate Velsor for her encouragement. Carmine J. Angrisani and my dear father, Robert E. Layford, coped with my absence patiently and provided me with emotional support for this adventure. Lastly, I salute the accomplishments and support of my beloved daughter, Jessica C. Bing, who began and will finish her own undergraduate educational odyssey at New York University during the same time as my sojourn at Nova Southeastern University. May she continue her grandmother's tradition and enlighten her future children in their educational quests. I am truly blessed and forever thankful to have had the opportunity to walk amid this outstanding company.

Table of Contents

Page

Acknowledgments iii

Abstract vi

CHAPTER I: Introduction 1
  Description of Community 1
  Writer's Work Setting 1
  Writer's Role 5

CHAPTER II: Study Of The Problem 6
  Problem Statement 6
  Problem Description 6
  Problem Documentation 12
  Causative Analysis 16
  Relationship of the Problem to the Literature 18

CHAPTER III: Anticipated Outcomes And Evaluation Instruments 27
  Goals and Expectations 27
  Expected Outcomes 27
  Measurement of Outcomes 29
  Mechanism for Recording Unexpected Events 33

CHAPTER IV: Solution Strategy 35
  Discussion and Evaluation of Solutions 35
  Description of Selected Solutions 42
  Report of Action Taken 44

CHAPTER V: Results 73
  Results 73
  Discussion 87
  Recommendations 88
  Dissemination 88

References 89

Appendices
  A Results: Information and Resource Questionnaire for Teachers (Sept., 1997) 97
  B Results: Information and Resource Questionnaire for Students (Sept., 1997) 102
  C On-Line Survey Results 105
  D Teachers Helping Teachers Mid Point Evaluation Form (March, 1998) 107
  E Teachers Helping Teachers Summative Evaluation (May, 1998) 110
  F Results: Information and Resource Questionnaire for Teachers (June, 1998) 115

Tables

1. Current Configuration of District Students, Educators, and Facilities (September, 1997) ... 2
2. Technological Resources Available for Teacher and Student Use in Elementary Buildings (September, 1997) ... 7
3. Technological Resources Available for Grade 7 & 8 Teacher and Student Use in Secondary Buildings (September, 1997) ... 8
4. Technological Resources Available for Grade 9-12 Teacher and Student Use in Secondary Buildings (September, 1997) ... 9
5. Teachers Successfully Utilizing CD-ROM Multimedia Resources with Classes (June, 1998) ... 74
6. Teachers Successfully Utilizing Resources of the WWW with Classes (June, 1998) ... 76
7. Teachers Successfully Demonstrating CD-ROM Data-base Research to Their Class (June, 1998) ... 80
8. Teachers Successfully Demonstrating Electronic Citation to Their Classes (June, 1998) ... 83
9. Teachers Using A Computer Application for Grade and Attendance Recording (June, 1998) ... 85

ABSTRACT

Enhancing Teachers' Awareness of Academic Opportunities for K-12 Students by Providing Face-to-Face, Web, and Video-Based Teacher Peer- Mentoring Programs That Synthesize Instruction and Technology. Bing, JoAnn L., 1998: Practicum Report, Nova Southeastern University, Ed. D. Program in Instructional Technology and Distance Education, Curriculum/Instruction, Educational Technology, Staff Development, Elementary, Middle and Secondary Education, Classroom Management, Teachers, Students

This practicum was designed to enable teachers to revitalize their classroom practice by providing them on-going instruction and peer support. Current methodologies and materials, both to facilitate daily classroom practices and to implement instructional activities, were not being utilized by teachers. Students had limited opportunities for breadth and scope as they constructed and demonstrated their knowledge. Many classroom practices and learning activities did not include usage of modern tools. Available electronic research and presentation resources were underutilized by teachers and students.

Individuals' skills were developed, instructional resources were provided, and organizational capacity was augmented simultaneously. Bi-weekly and monthly group instruction was reinforced by providing individualized assistance to teachers in daily and weekly classroom projects. Instructional resources provided included: CD-ROM multimedia materials, educational sites and search engines on the WWW, class-built web pages, the school computer facilities and TV studio, library resources of CD-ROM data-base research materials, cam-corders, and a series of web pages posted monthly by the writer (called Web Wanderings). Instructors and mentors included the writer and expert teachers.

An analysis of the data revealed that teachers increased their use of CD-ROM multimedia materials, educational sites and search engines on the WWW, electronic document citation, the library resources of CD-ROM data-base research materials, and the TV studio with their students. Though it was time-intensive, teachers and their classes enjoyed posting web pages related to class work.

****

Permission Statement

As a student in the Ed.D. Program in Instructional Technology an Distance Education, I do (x) do not ( )give permission to Nova Southeastern University to distribute copies of this practicum report on request from interested individuals. It is my understanding that Nova Southeastern University will not charge for this dissemination except to cover the costs of microfiching, handling, and mailing of the materials.

July 24, 1998
(date)

JoAnn Layford Bing
(signature)

CHAPTER I

INTRODUCTION

Description of Community

The writer's community work setting is a small, well-established, suburban, K-12, public school district in the northeastern United States. Both community and school district traditions of this small waterfront village connect strongly with the seaport. The town contains two hospitals, and nearby are located a state university, a third hospital, and a national scientific-research institution. Most village inhabitants are Caucasian, well-educated members of the middle or upper class who are well-informed and support their public schools' endeavors. No school budget has ever been defeated in this district although there have been ongoing controversies over the location of Grades 6-8, and methods for keeping costs down.

Writer's Work Setting

Within the last 12 years, the writer's work setting has undergone an unprecedented series of changes in enrollment, administrators, guiding philosophies, and facilities. The village high school celebrated its centennial in 1996. Since 1970, the student body's numbers have declined from over 2,000, Grades 9-12, with tuition students from several other districts, to less than 500, Grades 7-12, comprised solely of village residents. There has been a rapid succession of administrators in the past 12 years; the high school has had three principals in 12 years contrasting to the preceding principal's tenure of 23 years. The elementary and middle schools have also had three principals within 12 years. These 12 years have seen four superintendents; the two preceding superintendents served 38 and 14 years respectively. Though the student enrollment Grades pre-K-8 has remained constant, one of the three instructional plants, the former junior high school, has been leased. Grade levels, programs, and classrooms have been relocated. Table 1 illustrates the two district instructional buildings' current configurations.

Table 1

Current Configuration of District Students, Educators, and Facilities (September, 1997)

Grade	Enrollment	Classes/Teachers	Building
		Elementary school/	Elementary Principal
pre-K	53	3/2	elementary
K	66	3/3	elementary
1	77	4/4	elementary
2	85	4/4	elementary
3	78	4/4	elementary
4	79	4/4	elementary
5	87	4/4	elementary
		Middle school/	Middle school Principal
6	86	4/22	elementary
7	80	22	Secondary

table continues

Grade	Enrollment	Classes/Teachers	Building
8	82	22	secondary
		High School/	High School Principal
9	75	60	secondary
10	78	60	secondary
11	79	60	secondary
12	80	60	secondary

Note. Teachers are shared among all grades within the grade level range of 7-12.

These properties, located within 3 miles of each other, house Grades, pre-K-6, the district offices, and Grades 7-12. There are 17 teachers for Grades pre-K-3, 8 for Grades 4-5, 22 for Grades 6-8, 60 for Grades 9-12, and 7 itinerant teachers.

To make up for lost revenues, the budget has been cut, and managerial and support-staff positions have been abolished. Department chairmen have been eliminated, and the computer coordinator's teaching load has been increased to full-time. The composition of the veteran teaching staff has, however, remained unchanged; and many teachers are wary about administrative innovations. Of the 114 teachers in the district, 47 individuals have 21 years or more experience, and 24 are at the highest educational step possible (MA +75). Although this school community is not the only one being asked to do more with less, it is an unaccustomed state for the highly experienced teachers. As of 1996-1997, of a total teaching staff of 114, 47 individuals had 21 years or more teaching experience, and many have worked in this district for their entire careers.

Through all of this flux, the district has maintained a commitment to educational excellence and to providing technology-rich resources for learners; for example, the high school has one of the only television studios in the area. Since 1995-1996, there has been a separate budget line for technology equipment for the respective amounts of $100,000, $50,000, and $50,000 each year. The district is in the process of networking the instructional plants and acquiring standing-Internet access for any networked computer in the district. There is $21,000 in the 1997-1998 budget for that purpose. This networking effort was begun in 1995-1996; all of the elementary school classrooms with the exception of the Pre-K and K wing are now connected to an intranet. The 1997-1998 efforts focus on the secondary building that has the library, the computer laboratory, and the computerized writing center now connected to an intranet. The 1997-1998 school year budget includes $300,000 for hardware, software, and staff development.

The school district participates with a regional teacher center and local university to provide professional-development opportunities for staff. Almost half of the staff is at the top of the salary scale, so participation in these opportunities is somewhat limited. Initiatives for program and curricular improvement do, however, still occur. Teachers from the elementary, middle, and high school have just finished participating in 2-year, regional action-research initiative in authentic and portfolio assessment. Also, the board of education (1996) has stated this school district's support for conducting constructive educational research with its resources. Still, there is a gap between the vision and the actuality in curricular restructuring, technology implementation, staff development, and teacher training.

Writer's Role

This writer has taught high school English and developed a number of projects to infuse technology into the humanities over the course of her teaching career. In 1993, the writer began assisting with staff development in technology and instituted a computerized writing center in her work place. Through collaboration with the administrators, the writer created an environment in the high school that facilitates the practices of process writing with state-of-the-art technology for both students and teachers. It is a technology-rich, fluid space that enables patrons to create presentations in an egalitarian social environment. Learners manipulate text, images, sound, and video here according to their needs, purposes, and perceptions. As a part-time teacher there, the writer has served as a facilitator, coach, coordinator, editor, and adviser.

CHAPTER II

STUDY OF THE PROBLEM

Problem Statement

The problem to be solved in this practicum was that teachers' and students' needs for a broad range and scope of educational activities utilizing current instructional and research methodology and materials weren't being accommodated.

Problem Description

Current methodologies and materials, both to facilitate daily classroom practices and to implement instructional activities, were not being utilized by teachers. Students had limited opportunities for breadth and scope as they constructed and demonstrated their knowledge. Although providing a technology-rich learning environment was referred to in both this school district's vision and goal statements, many classroom practices and learning activities did not include usage of modern tools. Available electronic research and presentation resources were underutilized by teachers and students. Though the following resources did exist, they were not readily accessible as teaching and learning tools for the general school population. Even if pieces of equipment were in their classrooms, many teachers had difficulty incorporating their use into their lessons; and students' opportunities to use them as part of instructional activities were curtailed. Tables 2, 3, and 4, enumerate existing technological resources in the elementary and secondary buildings. Because they were not used by students and teachers for learning activities, administrative technological resources utilized by the superintendent's office, business office, attendance office, or guidance offices were not included in this discussion. Since the middle school was divided between the two buildings, it was not treated as a separate entity below; resources for Grades 6-8 are included with the information about the building in which each grade is housed. Grade 6's data are incorporated with the elementary building resources in Table 2, and data for Grades 7, and 8, are enumerated with the secondary building's data in Table 3. Resources shared by all of the individuals in a facility or section of a facility are labeled "shared".

Table 2

Technological Resources Available for Teacher/Student Use in Elementary Buildings (September, 1997)

Room Type	Grades	Equipment per Room
Classroom	pre-K and K	one, Windows platform, multimedia computer equipped with CD-ROM capabilities, one printer, 5 Apple II e computers
Classroom	1, 2, and 3	one, networked, Windows platform, multimedia computer equipped with CD-ROM capabilities, one printer
Classroom	4, 5	two, networked, Windows platform, multimedia computers equipped with CD-ROM capabilities, one printer
Classroom	6	four, networked, Windows platform, multimedia computers equipped with CD-ROM capabilities, one printer
Computer lab	Pre-K, K, 1	22 Apple IIe computers, one printer each
Computer lab	2, 3, 4, 5, 6	11, Windows 95 platform, computers, two Macintosh computers, a color and a laser printer, and a color scanner

table continues

Room Type	Grades	Equipment per Room
library	Pre -K-6	5 computers for library management including an on-line card catalogue, two, multimedia, Windows platform computers equipped with CD-ROM capabilities, one of which is networked
shared	Pre -K-6	one, networked, 14 drive CD-ROM tower with reference material for classroom use, two sign-out VHS cam-corders, two outside lines for dial-up Internet and WWW access

Note. All classrooms in the elementary building with the exception of Pre-K and K are networked to a district intranet; Resources available through this are labeled "shared".

Table 3

Technological Resources Available for Grade 7- 8 Teacher / Student Use in Secondary Buildings (September, 1997)

Room Type	Grades	Equipment per Room
Classroom	7, 8	one, Windows platform, multimedia, computer equipped with CD-ROM capabilities, and one printer
Computer lab	7, 8	24 Mac LC3 computers, one color scanner, one color printer, and one laser printer.
shared	7, 8	one outside line for dial-up Internet and WWW access, and one on-line user account

table continues

Room Type	Grades	Equipment per Room
library	7, 12	14 computers, all of which are networked to the intranet, four used for library management including an on-line card catalogue, two seven-drive CD-ROM towers for electronic data-bases and references networked to nine computers, five of which are Windows platform, equipped with multimedia and CD-ROM capabilities; one laser printer, an outside line with a user account and dial-up access to the Internet and WWW

Note. Because it services students in Grades 7, and 8, the library is included here and not repeated in Table 4. Currently, the library which is used by students Grades 9-12 is networked to a district intranet; the remainder of the 7-12 facility is scheduled to be connected to the intranet the 1997-1998 school year. Internet access available to Grades 7, and 8, through one dial-up account is labeled "shared".

Table 4

Technological Resources Available for Grade 9-12 Teacher and Student Use in Secondary Buildings (September, 1997)

Room Type	Grades	Equipment per Room
business computer lab	7, 12	10 computers, networked to the intranet, running DOS, and 18 Windows 3.1 platform computers networked to the intranet with two laser printers.
art and CAD mini-lab	9-12	nine Macintosh machines, five of which are multimedia computers equipped with CD-ROM

table continues

Room Type	Grades	Equipment per Room
art and CAD mini-lab	9-12	Capabilities, a color scanner, a color and a laser printer, a digital camera, and an outside line with a user account and dial-up access to the Internet and WWW_a
writing center mini-lab	9-12	two, multimedia, Macintosh computers equipped with CD-ROM capabilities, four LC3 Macintosh computers, and eight Windows '95 computers, six of which are equipped with multimedia and CD-ROM capabilities, one of which is networked to the intranet, a VHS cam-corder, a flat-bed scanner, a laser printer, and an outside line with a user account and dial-up access to the Internet and WWW_b
social studies classroom	9-12	one CD-ROM equipped, multimedia, Windows platform computer, an ink jet printer, and an outside line with a user account and dial-up access to the Internet and WWW
foreign language department office	9-12	one CD-ROM capability equipped, multimedia, Windows platform computer, and an ink jet printer

table continues

Room Type	Grades	Equipment per Room
special education resource room	9-12	six, Windows 3.1 platform computers, two for administration and record-keeping, and four for student use, and one laser and one ink jet printer
science department office	9-12	two, multimedia, Windows platform computers, equipped with CD-ROM capabilities, an ink jet printer, a Macintosh LC 3, and an outside line with a user account and dial-up access to the Internet and WWW
television production studio	9-12	two three-color cameras, five VHS cam-corders, two 1/2" SVHS editing bays, one VHS editing bay, an Amiga computer for creating titles, an Amiga 4000 toaster system for creating effects, four audio mixing boards, two time base correctors, a Sony production switcher, a lighting board, a lighting grid, and audio CD-ROM, and audio-tape-editing equipment

Note. Currently two of the mini-laboratories in the secondary building are networked to a district intranet; the remainder of this facility is scheduled to be connected to the intranet this school year.

[a] This mini lab is scheduled to receive another $40,000 of equipment during the 1997-'98 school year.

[b] This mini-lab contains two different types of equipment because its purpose is to provide both Windows and Macintosh equipment for its users so that students and teachers can bring work on discs back and forth from home and other locations in the school.

Problem Documentation

Much supporting evidence demonstrates the problematic nature of the lack of current materials and training for teachers and students. For teachers and students, access to the available tools was as great a problem as lack of ability to use them in some instances. For example, some resources such as the television studio and the computerized writing center were inaccessible because they were not staffed. They were locked for much of the day to protect the equipment housed there. Individuals needing to use these rooms were forced to try and locate the teachers who had keys, and if the "key keepers" were teaching a class, decide if they should interrupt them while they were teaching to ask for the keys, or to wait.

The writer gleaned data by administering an information and resource questionnaire to all students, Grades 7-12 (see Appendix B) and all of the teachers (see Appendix A) in her district. These data revealed dilemmas specific to the particular teachers, students, and facilities located there.

Few teachers utilized the resources of CD-ROM multimedia materials. Though 39 of 51 teachers' responses to questions 1 and 2 (see Appendix A), indicated that they always have use of a computer at home, and 31 responses indicated always having use of a computer at school; 33 responded to question 25 that they almost never or never used CD-ROM at home, and 40 responded to question 30 that they almost never or never used CD-ROM in school to prepare classroom presentations. Some, but not all of the disparity in these numbers could be accounted for by the fact that not all computers are equipped with CD-ROM capabilities.

Few teachers utilized the resources of the WWW. In another recently administered survey by the district technology committee to which 37 teachers responded (see Appendix C), 21 teachers commented that though they currently can not do so, they would like to use on-line resources in their classrooms. All 21 of the teachers responding requested training to use these on-line resources; some of them requested more equipment to enable them to go on-line, and some requested training to learn how to use the equipment they currently had. Interestingly, in the survey administered by the writer (see Appendix A), 23 responses to question 3 indicated that teachers always or almost always had access to the Internet at home, yet only 3 teachers responded to question 27 that they always, almost always or sometimes used their home Internet capability for classroom-related activities. Though they took advantage of the WWW for personal activities, they did not incorporate it into their pedagogy.

Few English, social studies, and foreign language teachers utilized the resources of the computerized writing center for instructional purposes. Through monitoring usage of this facility, the writer observed that only two English teachers including herself used this resource with their classes.

Few teachers utilized the resources of district computer laboratory and mini-laboratory facilities. In the survey mentioned earlier (see Appendix A), 20 of 51 respondents' answers to question 16 indicated that they almost never or never used any of the district technology facilities.

Few teachers utilized the resources of the TV studio. Through observations and interviews with the television teacher, the writer determined that only two teachers used the TV studio with their students. The writer also interviewed the librarian who could see the TV studio from the library and personally observed the frequent sojourns of frustrated teachers and students attempting to gain access to this often-locked facility.

Of the roughly 20,000 titles in the library's general print collection, approximately 50% were 1990 or earlier. Though the teacher response to the teacher survey (see Appendix A) question 12 indicates that 27 teachers preferred print references to the 24 who preferred non-print references, the library print collection was not being augmented. When students were asked the same question, (see Appendix B) only 129 of 457 chose print references. There was a mismatch between the teachers' and students' preferred reference media.

Few teachers used cam-corders in instructional activities. When teachers responded to survey questions 23 and 28 (see Appendix A) asking if they used cam-corders at home or school to prepare classroom presentations, 51 said they used them at home sometimes, almost never, or never. Of those responses, 33 individuals answered never to using cam-corders at home. Answers about school cam-corder usage to prepare classroom presentations were slightly higher; 47 teachers said they used them in school sometimes, almost never, or never. Of those responses, 30 answers indicated never using cam-corders at school.

Few teachers designed and administered assignments in media requiring students to utilize materials other than paper, and pen, or pencil. From working on the 2-year district initiative and participating in a 2-year, regional action-research initiative in authentic and portfolio assessment, the writer knows that a cadre of 6 teachers in the district had begun portfolio work with their students. This type of work is facilitated enormously by utilizing modern electronic materials. From this group of six teachers, only three secondary teachers had created assignments requiring their students to utilize the World Wide Web, (WWW). Also, from monitoring the district web pages, the writer knew that only two secondary teachers had created assignments requiring students to create and post web pages.

Few teachers provided their students with opportunities to use search engines and cite electronic documents to facilitate research. Only 3 secondary teachers had access to an Internet account outside of the library. If the other teachers weren't using the library Internet accounts with their students, it is improbable that they were teaching them how to use search engines. Teacher responses to questions 13 and 15 of the survey administered by the writer, (see Appendix A) indicated that only 7 of 51 teachers always, almost always, or sometimes, use the local or school library Internet, yet 35 teachers always, almost always, or sometimes, allowed students to cite electronic documents. When students responded to the same questions, (see Appendix B) 363 answered question 15 that they almost never, or never, used the local or school library Internet, and 201 answered question 16 that they almost never, or never, cited electronic documents. From this data, the writer deduced that little instruction on usage of search engines and citing electronic documents was occurring.

Few teachers augmented their instructional efficiency by increasing their time for planning through successfully using computer applications for grade and attendance-keeping activities. Through questioning the administrative assistant in charge of report cards, the writer learned that only 3 secondary teachers took advantage of available computer applications to eliminate the time-consuming task of filling in bubble sheets for grade recording. Several teachers had expressed interest in learning how to use the available software.

Causative Analysis

Many causes contributed to the problem, however lack of teacher training was the most obvious. Though responses to questions 39-47 of the appended teacher survey (see Appendix A) indicated a lack of access to equipment, teachers clamored for help in learning how to use modern materials. When answering question 37 of the survey, (see Appendix A) 10 teachers chose “always,” 24 teachers chose “almost always,” and 13 teachers chose “sometimes,” as their response to the statement; “I find training in technology use personally helpful ”(see Appendix A). Teachers lacked the skills to utilize the resources of CD-ROM multimedia materials. In another recently administered survey, (see Appendix C) 21 teachers requested technology training.

Teachers lacked the skills to utilize the resources of the WWW. Though the percentage of teacher responses to questions 3 and 22, (see Appendix A) and student responses to questions 5 and 22, (see Appendix B) demonstrated that Web use is high (see Appendix B); this use was not being transferred into their academic lives.

English, social studies, and foreign language teachers lacked the skills to utilize the resources of the computerized writing center. The writer was, at times, summoned from class to assist frustrated students in this facility because of their teachers' inexperience with the equipment there. She also assisted teachers who were having difficulty there.

Similarly, teachers lacked the skills to utilize the resources of other district computer laboratory and mini-laboratory facilities. In many of those facilities, teachers had no other teacher to call on for help. Teachers also lacked the skills to utilize the resources of the TV studio. In conversation with the writer, many teachers indicated that using the studio was simply too difficult and inconvenient. Most of the students, however, had little trepidation about learning to use this facility and were eager for opportunities to work there.

Teachers and students demonstrated similar discrepancies in their preferences for print or electronic references in the library. As noted earlier, the students strongly favored using non-print references, and the teachers slightly favored print. There, however, were not enough funds to accommodate both preferences in the budget, and the district had opted for augmenting the non-print resources. Because the moneys had been budgeted for alternate means of presenting materials, the cost of implementing technology into the library consumed much of its budget; and the general, print, paper collection suffered. So, it was even more important that teachers become facile users of electronic references and the equipment on which they are accessed.

Another key piece of underutilized instructional equipment was the cam-corder. Teachers lacked cam-corders and the skills to use them in instructional activities. Anyone who has attended a school play can attest that cam-corders are utilized extensively to document personal family highlights. Yet, teachers had been unable to learn how to incorporate their use into curricular activities. Teachers also lacked the skills and time to design and administer assignments in media requiring students to utilize materials other than paper, and pen, or pencil. Although numbers of Internet users were growing, teachers were unfamiliar with using search engines and electronic documents to facilitate research. Though they chronically lamented their lack of time, teachers lacked the skills to utilize computer applications for grade-and-attendance keeping activities that could give them more time for planning and instructional activities. These are some of the reasons why 19, 22, and 8 teachers respectively responding to Question 38 said that they "always", "almost always", and "sometimes" saw a need for training in technology use (see Appendix A).

Relationship of the Problem to the Literature

Many professionals have examined aspects of this problem in other settings. Books, periodical and journal articles, research studies, conference presentations, papers and electronic documents all have examined aspects of the gap between what current instructional and research methodology and materials are available for teachers and students and what is being utilized in classrooms.

The literature both provides evidence and documents the scope of this dilemma, and much literature specifically treats problems regarding classroom technology infusion The United States Department of Education's Office of Educational Research and Improvement (1997) called for a reconsideration of educational practices focusing on minimizing the risk of misuse of emerging educational technologies and maximizing their potential to support learning. Thompson (1996) asserted that educators must remember that though computers have drawn attention to educational technology, the former is only one form of the latter and should not be the only tool gaining educators' attention. Thompson also demonstrated how psychology's shift from behavioral to cognitive paradigms has influenced educational technology research. Early research designs assumed that the technology alone influenced the learning process, studied the effects of instructional technology, and compared media effectiveness. The data they provided was not entirely helpful because they shed little light on how the attributes of a particular tool or media worked with the individual's thinking processes; newer aptitude treatment interaction and intra-medium studies have begun to address these essential questions. Bedford (1996) traced the writer's district's attempts to serve both its remedial and gifted population and raised questions for more effective technology use in the future.

Mehlinger (1995) asserted that though technology is no panacea for all of school's problems, until educators harness modern technology's power and appeal, it is improbable that educational reform will succeed or that students will attain higher-level learning. He continued by stating that although American schools have been largely successful to date, current educational needs have changed due to social and attitudinal changes. Many of these social and attitudinal shifts have been impacted greatly by technology. The United States Department of Education's Office of Educational Research and Improvement Report (1997) explained educational technology's promise and risk; when synthesized with relevant and stimulating activities, educational technology creates new vistas for teachers and learners. However, the United States Department of Education's Office of Educational Research and Improvement Report exhorted that if educators superimpose these tools on dull, mental student operations, they actually increase the lifelessness of the experience. In other words, good teaching is augmented tremendously by appropriate technology infusion, poorly conceived pedagogical activities are exacerbated by technological enhancement.

Yet, providing appropriate tools for learners or shifting theoretical paradigms does not insure innovation utilization by teachers. Dede (1993a) pointed to the two most prevalent mistakes in technological planning: "overestimating the speed of diffusion of an innovation and underestimating its eventual consequences and side effects" (p. 601). The consequences and side effects of seamlessly integrating current instructional and research methodology and materials into classroom activities are enormous. Heinrich, Molenda, Russell, and Smaldino (1996) noted that the probability of acceptance of any new technology depends upon how it affects what the people within the organization do. In a similar vein, Snyder (1994) showed how a technology will fail to be used consistently in a school environment if teachers are not convinced that it is helpful to them. The ways in which teachers teach and students learn are radically altered by these new instructional resources. Yet, evidence of their educational superiority validating the effort needed to master them is inconclusive. Woolsey (1996) explored the gap between guidelines in the curriculum and learning activities in the classroom; the former may be elaborate, yet the latter which are not always explicitly developed are the essence of learning. Reigeluth (1996) cautioned that if educational systems do not change in response to evolutionary needs of the larger systems they serve, they will no longer be supported or tolerated by them

National and state reform efforts clamoring for modern methodology and resource utilization and instruction anchored in authentic activity are not being met. Hall (1997) demonstrated the complexity of social and educational issues affecting successful technology integration. She addressed lack of incentives and support for innovation, inadequacies in the conventional role of the instructor, and traditional educational concepts of place and time, as well as educational institutions' cultural barriers to innovation. According to her, schools and universities are most resistant to the structural changes which successful technology integration necessitates. Yet, responding to polysemous national and state dictates for up-to-date methodology and materials is difficult.

Much literature specifically treats problems relating to teaching and learning with media, multimedia, hypermedia, and the Internet, and WWW. Perhaps one of the most ubiquitous technologies of the era is television. After surveying 40 years of research on the effects of television upon learners, Seels (1996) found that though it is an effective teaching tool, classroom television's negative effects have been emphasized instead of underscoring the effectiveness of attempts to insure positive learning outcomes through necessary teacher interventions. Today, multimedia and the WWW have burst on the educational scene in much the same way that television did some years ago. Though many educators are intrigued with the possibilities the Internet and WWW offer for current research and authentic activities, they are stymied as to how to utilize them effectively, and data are scarce. Moore (1996) cautioned that very few of the studies and reports extolling the promise of hypermedia implementation are actual experimental studies. Shields (1997) traced learners' and teachers' surprisingly rapid progress from consumers to creators and producers of multimedia artifacts. Because this change of roles has occurred so rapidly, effective instructional methodology has not been able to develop. Speed and thoughtfulness are not synonymous, and in such a complex, high-stakes arena, solid research is invaluable. Shields also described how multimedia challenges its users to discriminate between the flashiness of the presentation and the lucidity of the content.

Gayeski (1993) cautioned that although multimedia's displays and designs are appealing, an examination of how they fit into current educational systems is needed. Ingram (1996) documented that much multimedia lacks true interactivity; interactive multimedia teaching should necessitate that learners interact cognitively with the material.

This era has been dubbed the "Information Age", and telecommunication is one of its prevailing media. Elam (1996) summarized a national poll stating that 80% of the American public strongly support providing schools access to electronic global communication. Dyrli and Salpeter (1997) quoted a national opinion poll: although "93% of 507 K-12 teachers responded to a survey that using the Internet in classrooms was an 'excellent idea,' 72% give themselves a 'C or below' grade on their knowledge of how to use it" (p. 55). Dyrli and Salpeter (1997) commented that according to a recent survey conducted by Sun Microsystem, over half of the educators believe that children should start using the Internet in Grades 1, 2, or 3. Dyrli and Salpeter (1997) asserted that this survey indicates that the most common reason teachers want Internet access is for research purposes.

The enormous interest and demand for educational usage of the Internet is not entirely warranted. (Mergendoller, 1997) emphasized that the Internet's instantaneous access and communication features are not necessarily related to instructional goals, nor do they automatically have more value than traditional resources. Also, as appealing as the classroom possibilities of the WWW may be, its effective educational implementation is difficult. Boling (1996) illustrated that the relative ease with which pages for the WWW can be authored and posted belies the complex design issues to be confronted when connecting those pages into a web site. Angell (1996) examined the complexities of the Web site and demonstrated the serious planning spheres it encompasses: technical, organizational, and financial. The Global School Network (1997) demonstrated the limitations of the view of many school districts toward Web Sites; i.e. as multimedia printing presses to be viewed by an international audience.

Problems associated with training teachers to master the use of new resources in their classes are also addressed in the literature. Darling-Hammond (1996) summarized the National Commission on Teaching and America's Future's 1996 Report which contrasted American school district's lack of funding for professional development and planning time for teachers with European and Asian countries' allotments of between 15 and 20 hours per week for teachers' joint planning and learning of new methodologies. Mergendoller (1997) cited recent research indicating that in the average elementary school, computer use is limited to each student performing computer drill activities approximately 1 hour and 45 minutes per week. In the writer's district, though all students, Grades K-6, receive 40 minutes of computer instruction in the computer laboratory each week, individual students have additional opportunities for computer activities such as word-processing their assignments or using subject-related software in their classrooms. When teachers from this elementary school completed a survey, (see Appendix A) 16 of 18 respondents to Question 37 stated that technology training is always or almost always personally helpful. Yet, Mergendoller (1997) presented survey results from a group of Utah elementary school teachers revealing that they spent the majority of their free time working alone to learn how to integrate technology into their teaching; a small percent of time was spent working with colleagues, and almost no meaningful time was spent in technology infusion courses. Sandholtz and Ringstaff's studies (1996) chronicled four areas of teacher concerns in Apple Classrooms of Tomorrow (ACOT) : "beliefs, management issues, instructional strategies, and student assessment" (p. 283). They discovered that even with the optimal combination of human and technological support, innovation occurs slowly, and there are periods of regression.

Several causes for the discontinuity between technological implementation theory and daily practice are indicated in the literature. To explain the slowness with which schools adapt technologies and the rapidity with which they discontinue their use, Johnson (1996) reconfirmed the cycle Cuban (1986) identified: (a) a new technology's promise leads to extravagant claims (b) its use is successful in small richly supported pilot and research situations (c) classroom teachers become frustrated when they attempt to use it without support, and (d) its use desists (p.1017). Griest (1996) examined the complex, interrelated physical, technological, pedagogical, and organizational scopes of control issues surrounding computer education. Similarly multi-faceted and paradoxical implementation issues arise regarding educators' attention to technology in formal curriculum and daily classroom procedures.

Some causes of the problem of providing modern learning resources deal with false premises about schools and learning. Rhodes (1995) posited that flawed assumptions about the work of schools and misconceptions about just-in-time learners are barriers to technologically supported change. Fisher (1996) acknowledged that maintaining working technology systems has hidden costs; time and stress, which are often overlooked. Edgar (1996) examined how imaginative K-12 and college educators with vision and the courage to persist in spite of difficulties must also confront social and political considerations surrounding technology implementation. Thompson (1996) posited that generally curriculum has not been integrated with the application of newer technologies. In a study conducted in a high school, Hecht (1996) demonstrated that while students of team teachers outperformed other groups, incorporating computer technology did not yield better results because teachers viewed it as an add-on to a full curriculum. This problematic pattern is complex and systemic. Dyrli (1994) illustrated the futility of efforts of technology committees unless they first focus on the priorities and philosophies of their respective school systems.

Literature and research provide proof that providing up-to-date educational activities is a complex and pervasive problem. National and state documents advocate using a variety of instructional tools to individualize instruction and anchor learning in an authentic context. The public has demonstrated its support for providing global communication in schools. Many researchers agree that, to date, in spite of enormous expenditures on equipment; technology infusion, for the most part, has failed to deliver better learning opportunities. Yet there is an enormous demand for innovation, particularly regarding distance learning. Integrating these resources into their classroom practice is a struggle for teachers, even when they have integrated them into their personal lives.

The data suggest that there have been several causes for the disparity between available instructional and research methodology and materials and what is implemented in classrooms on a regular basis. Due to the rapidity with which new educational opportunities have become available and the relative slowness with which learning institutions respond to change, a gap has opened which schools are attempting to confront. The challenges, consequences, and side effects of seamlessly integrating the learners' needs, the teachers' resources, the learning activities, the curriculum, and the learning tools, are sometimes subtle, yet always far-reaching. Teachers have received inadequate support to revise their methodologies, and the time needed for learning, implementing, and revising strategies is not available to them.

CHAPTER III

ANTICIPATED OUTCOMES AND EVALUATION INSTRUMENTS

Goals and Expectations

To meet the identified teacher and student needs for a broad range and scope of educational activities utilizing current instructional and research methodology and materials, the writer delineated an anticipated goal and outcomes of this practicum. Teachers and their students would utilize current instructional and research methodology and materials to experience a broad range and scope of educational activities. The following outcomes were projected for this practicum:

Expected Outcomes

The writer expected several outcomes from this practicum. By the end of practicum implementation, the following outcomes would be realized:

1. Of the 30 targeted secondary and elementary teachers, at least 15 will utilize the resources of CD-ROM multimedia materials to teach a class as measured by sign- in logs in computer facilities and observations.

2. Of the 30 targeted secondary and elementary teachers participating in the graduate/in-service course or Collegial Circle, at least 15 will demonstrate competency by accessing and utilizing the resources of the WWW to explore at least three educational sites with their students as measured by observations and librarian's records.

3. At least 5 English, social studies, or foreign language teachers will demonstrate competency utilizing the resources of the computerized writing center by teaching a class there as measured by observations and sign-in logs.

4. At least 10 of the 30 targeted secondary and elementary teachers participating in the graduate/in-service course or Collegial Circle will utilize the resources of the district computer facilities by teaching a class in one of them as measured by observations and sign-in logs.

5. At least 5 teachers will utilize the resources of the TV studio by teaching a class there as measured by observations and sign-in logs.

6. Of the 30 targeted secondary and elementary teachers participating in the graduate/in-service course or Collegial Circle, at least 15 will retrieve current information by accessing and utilizing the electronic library resources of CD-ROM data-base research materials in at least one class project as measured by observations.

7. Of the 30 targeted secondary and elementary teachers participating in the graduate/in-service course or Collegial Circle, at least 5 teachers will successfully use a cam-corder as part of an instructional activity as measured by observations and equipment sign-out.

8. Of the 30 targeted secondary and elementary teachers participating in the graduate/in-service course or Collegial Circle, at least 10 teachers will design and implement an assignment requiring their students to utilize materials other than paper, pen, or pencil, as measured by observations and submissions to Web Wanderings.

9. At least 15 of the 30 targeted secondary and elementary teachers participating in the graduate/in-service course or Collegial Circle and their students will gain experience with using search engines and citing electronic documents as measured by observations and librarian's anecdotal records.

10. At least 10 of the 30 targeted secondary and elementary teachers participating in the graduate/in-service course or Collegial Circle will demonstrate competency with computer software in classroom management by successfully using a computer application for grade and attendance keeping as measured by administrative records.

Measurement of Outcomes

For outcome 1, the following evaluation tools were used: (a) sign- in logs in computer facilities, (b) and observations. Any teachers participating in the graduate/in-service course or Teachers-Helping-Teachers or the Collegial Circle completed tasks involving utilizing the resources of CD-ROM multimedia materials with their students. The standard of achievement for this outcome was that 15 teachers successfully identify and access the components of CD-ROM i.e. identify disc, identify CD-ROM drive and load and play disc in drive; and use these materials as part of a lesson with their classes by the end of month 7 of implementation. As teacher and facilitator of the graduate/in-service course, Teachers-Helping-Teachers, and the Collegial Circle, the writer observed the teachers as they demonstrated their skills. Sign-in logs in computer facilities and feedback from other teacher mentors provided further data regarding teacher usage of equipment and resources.

For outcome 2, evaluation tools used included: (a) observations, and (b) librarian's records. Any teachers participating in the graduate/in-service course or Teachers-Helping-Teachers or the Collegial Circle produced printed proof of web pages visited. The standard of achievement of this outcome was that 15 teachers, as part of a lesson with their classes, successfully demonstrate the use of a Web Browser to their students, explore at least three educational sites'materials with them, and print the pages visited by the end of month 6 of implementation. The other teacher mentors also observed teachers perform these tasks and reported their observations to the writer.

For outcome 3, the following evaluation tools were used: (a) observations, and (b) sign-in logs. The writer observed and, wherever possible, assisted teachers as they brought their classes to the computerized writing center. The standard of achievement was that as part of one or more classes, 5 teachers successfully assist their students in using the equipment in the room. They would successfully open a word-processing or other lesson-related application, and produce and print a document for class credit, by the end of month 7 of practicum implementation. Since the writer personally assisted teachers and students, sign in logs proved to be necessary. Even when teachers and classes used the center during times when the writer was unavailable, the writer assisted teachers in preparing their lesson beforehand and requested that an extra copy of the students' work be printed for her record-keeping. In most cases, the extra copy also proved to be unnecessary because the students usually printed extra copies whenever the printer queue as slow to respond, and the printer tray contained extras when the writer returned to the center!

For outcome 4, the following evaluation tools were used: (a) observations, and (b) sign-in logs. Any teachers participating in the graduate/in-service course Teachers-Helping-Teachers, or the Collegial Circle would be required to teach a class in one of the district computer facilities and to record that lesson on videotape for evaluation by other course and/or Circle members, the writer, and other course teachers. The standard of achievement was that at least 10 teachers would successfully instruct students in the use of the equipment in the computer facility so that they could produce and submit a class-related assignment there by the end of month 7 of the practicum.

For outcome 5, the following evaluation tools were used: (a) observations, and (b) sign-in logs. Any teachers participating in the graduate/in-service course or Teachers-Helping-Teachers, or the Collegial Circle would be required to teach a class in the TV studio and to create a videotape for evaluation by other course and/or Circle members, the writer, and other course teachers. The standard of achievement was that at least 5 teachers would successfully instruct students in the use of the equipment in the TV studio so that they could produce and submit a class-related videotape there by the end of month 7 of the practicum. Though the writer was able to be in the studio on some occasions, the television teacher observed most of the activity in this facility and reported his findings to the writer.

For outcome 6, evaluation tools to be used included: (a) observations, and (b) librarian's records. Any teachers participating in the graduate/in-service course or Collegial Circle would be producing printed proof of information garnered from CD-ROM data-base research materials, or a video of a lesson using these resources for evaluation by the writer or other course teachers. The standard of achievement was that

15 teachers would utilize the library to successfully demonstrate the use CD-ROM database research materials to their students, and students would retrieve information as part of a lesson with their classes by the end of month 7 of implementation. The librarian kept written records of all of the teachers and students who used these resources every week and shared the data with the writer.

For outcome 7, the following evaluation tools were used: (a) observations, and (b) equipment sign-out records. Any of the secondary and elementary teachers participating in the graduate/in-service course would be required to successfully use a cam-corder as part of a lesson for evaluation by the writer or other course teachers. The standard of achievement was that at least 5 teachers would successfully identify the parts of a cam-corder, load a videotape in it, videotape a class activity and play back the videotape by the end of month 5 of implementation. The television teacher kept records of these activities and reported his findings to the writer.

For outcome 8, the following evaluation tools were used: (a) observations and (b) submissions to Web Wanderings. Any of the interested course, or Teachers-Helping-Teachers, or Collegial Circle participants would implement an assignment with their students and provide the results for evaluation by course teachers or Circle participants. The standard of achievement was that by the end of month 7 of the practicum implementation, 10 Web pages created by students to fulfill teacher assignments would be printed, evaluated, revised, and posted to Web Wanderings. Since the writer herself built and uploaded Web Wanderings, and maintained the web site on which it was housed, she was able to monitor all the additions. In addition, the file transfer protocol program used for uploading work to the web provided a dated list of all additions to the site which was a verification of the writer's records.

For outcome 9, the following evaluation tools were used: (a) observations, and (b) librarian's anecdotal records. Any teachers participating in the graduate/in-service course, or Teachers-Helping-Teachers, or the Collegial Circle would be producing printed proof of web searches and citation of electronic documents. The standard of achievement of this outcome was that 15 teachers would successfully demonstrate the use of search engines to their students, and demonstrate how to cite at least three electronic documents to them. Students would perform searches and cite these documents as part of a class assignment by the end of month 7 of implementation. The librarian's written records again provided additional data to the writer's observations.

For outcome 10, the following evaluation tool was used: administrative records. The standard of achievement was that at least 10 of the 30 targeted secondary and elementary teachers participating in the graduate/in-service course or Collegial Circle would successfully record their grades without using bubble sheets. After each quarterly grade reporting, the administrative assistant in charge provided the writer with a list of those teachers who submitted via disk.

Mechanism for Recording Unexpected Events

In addition to keeping an anecdotal and reflective practicum log and taking notes during the graduate/in-service course, Teachers-Helping-Teachers, and the Collegial Circle, the writer videotaped many of these activities. The combination of notes and video provided a double source of data for observation, analysis, and reflection. Through monitoring these written and video records, the writer was able to both record unexpected events, and reflect about necessary adjustments to implementation activities. Also, the writer noted any comments, concerns or suggestions communicated to her by teachers, students, administrators, or community members.

CHAPTER IV

SOLUTION STRATEGY

Discussion and Evaluation of Solutions

The problem was that teachers' and students' needs for a broad range and scope of educational activities utilizing current instructional and research methodology and materials weren't being accommodated. The writer's solution strategy was a comprehensive, sequential, implementation plan based on strategies selected from current topical literature. Literature offered many possible solutions for consideration, and many of these solutions concentrated on effective technology infusion into schools. The Office of Technology Assessment of the Congress (1995) determined that concomitant with technology investments must be human resource allotments, i.e. training and support, investments. The Office of Technology Assessment of the U.S. Congress also recommended a combination of any these possible methods for technological innovation: " 'technology rich' model schools; training a cadre of teachers who train and help colleagues, providing expert resource people, giving every teacher a computer; training administrators alongside teachers; and establishing teacher resource centers" (p.129).

Kearsley (1994) postulated that attention, appropriate actions, and time can correct most problems with electronic technologies in education; however potential users must believe that the innovation will attain an identifiable objective. Carter (1997) reported that realistic staffing needs for successful infusion of technology in schools include both educational implementation partners and technical support personnel the learners' needs in the center of delivery system. Thompson (1996) summarized research indicating that current technology use emphasizes process and problem solving. Thompson also cited research emphasizing technology's role in designing legitimate educational opportunities actively involving students. BOCES (n.d.) provided a comprehensive index and annotated list of K-12 educational standards and curriculum framework documents with several examinations of technology's role in both national and state frameworks, standards, and curricula as a resource for educators to consult. Thompson summarized technology research emphasizing "the process of learning rather than the outcomes of teaching" (p. 64).

Thompson also posited that the current emphasis is on combining computers with other technologies. Thompson showed research emphasizing the benefit of synthesizing specific student characteristics with specific technologies. Moursund, (1996) delineated topics to consider when deciding which technologies to learn to use: (a) the correlation between learning the tool and learning basic concepts, (b) the expenditure of resources to learn to use the tool effectively, (c) the tool's appropriateness for attaining achievement and standards, and (d) the tool's availability and cost effectiveness relative to others (p. 44).

Much literature deals with successful strategies for supporting teachers as they attempt to integrate technology into their practice. Sandholtz and Ringstaff (1996) described how teachers learning how to consolidate classroom environments and technology appear to progress in steps: "entry, adoption, adaptation, appropriation, and invention" (p. 287). Rhodes, (1996) explained research proving that educators in this cooperative learning, and interdisciplinary approaches combine well, these do not mesh with present time and space structure of schools; therefore cyberspace experiences are a feasible place to begin. One aspect of the writer's strategy was to create a cyberspace for teachers and students to use.

Ongoing, effective, professional development must combine meaningful intellectual content with cognizance of the varied contexts of teaching and experiences of teachers (Shanker). Also, ongoing, effective, professional development must be grounded in the purposes and practices of the institution. Therefore, the writer participated actively in district-wide technology endeavors. Professional development must also provide room for informed disagreement and support teachers to change in a milieu hostile to innovation. Technophobia and homeostasis must be addressed by providing incentives to change. So, the writer provided both credit-bearing course and release-time training opportunities for her colleagues. Finally, the impacts of technology infusion upon all the stakeholders must be considered, and the process should be systemic. Therefore, individuals' skills were developed, instructional resources were provided, and organizational capacity was augmented simultaneously in the writer's plan.

The writer's solution strategy was a comprehensive, sequential, practical implementation plan based on ideas selected from current topical literature. Teachers received training to utilize the resources of CD-ROM multimedia materials, and the WWW. Also, teachers were trained to utilize the resources of the computerized writing center. In addition, teachers received instruction to utilize the resources of district computer laboratory and mini-laboratory facilities. At the same time, teachers received training and support to utilize the resources of the TV studio. The electronic research materials in the library would be more fully utilized making the text collection's shortcomings irrelevant.

Teachers also received training to use cam-corders in instructional activities. Additionally, teachers received training and support to design and administer assignments requiring students to utilize materials other than paper, and pen, or pencil. Concurrently, teachers received training and support to integrate the use of search engines and electronic documents into their methodology. Finally, teachers received training and support to utilize computer applications for grade-and attendance-keeping activities.

Report of Action Taken

During the 8 months of implementation, this writer served in multi-faceted roles. She developed, administered, and examined results of surveys and questionnaires for teachers and students. Also, the writer developed the syllabus for a graduate/in-service course called Tailoring Technology for Everyday Classroom Practice: Curricular Considerations and State Standards. She also consulted with the regional teacher center and local administrators to finalize graduate/ in-service course logistics. The writer consulted with: the library media specialist, computer coordinator, director of computer services, teachers, and administrators to assess resources for the graduate/in-service course and scheduled guest teachers for special areas of study. As well as coordinating and teaching the majority of the graduate/in-service course classes during month 1 and 2 of the implementation phase, the writer provided on-going assistance to the 9 course participants and other teachers and students in the Computer Writing Center for the entire implementation phase. During month 3, the writer was permitted to provide a workshop to the high school staff who had participated in the graduate/in-service course during the school day.

From the beginning of implementation, the writer provided extra training and support to interested individual teachers during the school day. Initially, she assisted with rudimentary skills such as: navigating the icons on the desktop, opening programs, creating and saving documents, and using a computer application for grade and attendance keeping. As teachers' skills increased, she assisted them with developing units of study which allowed students to utilize electronic information retrieval and presentation resources, setting up the laboratory or class room facilities, and delivering instruction to their students.

Though initially the writer had intended to help colleagues to write grants for equipment, when she learned that the granting institutions had changed their criteria and would not accept any grants for equipment, she redirected her efforts toward grants for more in-school teacher training. The writer wrote, submitted, and was awarded two mini-grant proposals for on-going training workshops so that teachers could implement strategies in their classrooms and receive continuing support for their effort. One of them, entitled Teachers-Helping-Teachers, featured the writer and four other staff mentors from the elementary and secondary buildings. Together, they trained 20 teachers in information presentation and delivery through electronic platforms during the school day for 5 half-day sessions from month 4 through month 8 of implementation. This initiative was created by the writer in response to formative evaluations from participants in the graduate/in-service course during months 1 and 2.

The other mini-grant proposal was for a Collegial Circle incorporating technology and curriculum to reach more teachers. A Collegial Circle is an opportunity for teachers to receive in-service credit by working together with the moderator after and during the school day for 15 hours to develop, and present, classroom instructional activity designs and curricular projects with their colleagues. Both mini-grant endeavors as appealing to many teachers as a graduate/in-service course because teachers received release time for some of the contact hours.

The writer served on the district technology committee and headed its effort to write, revise and submit a comprehensive, 3-year technology plan and budget to the state. The writer also worked on a technology committee subcommittee charged with writing a district acceptable use policy.

The writer published and disseminated 8 monthly Web Wanderings (a district WWW newsletter in electronic and paper format) featuring sites of interest to the learning community. The writer updated and augmented the district web site and assisted teachers in posting pages there. The writer solicited students and volunteer teachers for pilot projects and assisted them in implementation. For the duration of the practicum, the writer collected and analyzed data, reported findings, drew conclusions, and helped the district plan for the future.

The 1st week of month 1 of the practicum implementation phase, the writer instituted and continued weekly procedures until implementation completion. These practices included coordinating with the librarian about electronic resource utilization and monitoring, and consulting with the director of computer services to iron out any hardware, software and/or network difficulties.

Also during the 1st week, she determined graduate/in-service course content after assessing technology training needs and available resources by analysis of surveys of teachers and students, discussion with the district computer coordinator, director computer services, administrators, and teachers. Then, she dialogued with the Teacher Center and sponsoring college about in-service /graduate course requirements and schedules and mini-grant procedures. With this information, a tentative syllabus for a graduate/in-service course was set. Then, possible guest teachers were approached to ascertain their availability. The writer pre-publicized the graduate/in-service course within the district and determined which days of the week were most convenient for teachers there to attend.

Week 2 of the implementation phase, the writer analyzed information from stakeholders, monitored resources, and adjusted the graduate/in-service course accordingly. After further study of her data-gathering instruments, the writer observed a difference between teachers' and students' preferred methodology for researching; not surprisingly, the teachers preferred print, whereas the students preferred electronic materials. This heightened the need to emphasize electronic resources in the course. Many teachers requested training during the school day due to child-care and scheduling conflicts; the writer began planning to accommodate them the second half of implementation. The writer then integrated the exact language from the new state standards in the graduate/in-service course materials at the Teacher Center's behest. The writer tested the Computer Writing Center equipment and software, put in work orders to have the necessary hardware repairs and software upgrades made to make the facility ready for teaching the graduate/in-service course, and requisitioned computer disks for the teacher participants. Nine district teachers enrolled in the graduate/in-service course.

Week 3 of implementation phase, the writer coordinated resources, finalized the graduate/in-service course, and began coordination of Web Wanderings. Guest instructor's schedules were finalized, and a memo was sent to the director of computer services thanking him for making the necessary upgrades and repairs. Next, the writer analyzed the teaching schedule of course attendees and was able to change the starting time of the course to ½ an hour earlier in the day making attendance more convenient. She notified all participants of the time change and prepared packets of course materials to be distributed. To contextualize course activities, she gathered information on Gardner (1995) and surveys, (Armstrong, 1994), which participants could take to determine their own multiple intelligence profiles. To motivate teachers to use computers often, she prepared directions for using Integrade Pro (1997) grading software which would eliminate the chore of preparing bubble sheets to record progress reports and grades. Finally, she prepared directions for how to print computer screens. Whenever possible, she prepared assignments as files to be accessed via the computers as well as on paper. This kept beginners practicing how to open and manipulate files, and modeled providing different ways of accessing information for learners.

Then, she arranged to have the administrative assistant for Grades 7-12 create individual disks containing each course participant's class rosters. Through discussions with the computer coordinator, she determined that grading processes and practices in the K-6 grades were not appropriate for the software being used in 7-12, so she prepared materials to facilitate classroom management with Microsoft Office (1997) for those teachers.

That week, the writer also began consulting with district administrators and teachers to assess available human and technical resources for electronic presentational platforms. She began identifying and dialoging with district students, Grades 7-12, and district teachers, Grades pre-K-12, with the expertise, capability, or the desire to participate in the Web Wanderings project.

During the 1st 3-hour meeting of the graduate/in-service course which took place after school the 4th week of implementation, the writer was the only instructor. To make the atmosphere convivial and lively when participants arrived, music was playing from the CD-ROM drive of one of the multi-media equipped computers, fruit, popcorn, juice and water were set upon one table, with course hand-outs, professional magazines, and recent educational technology publications. After welcoming participants, the writer called their attention to a particular song playing which was personally evocative of her teaching career and the challenge of innovation, "Truckin" by the Grateful Dead (Garcia, 1972). This broke the ice, and she continued by lowering the music and asking each participant to speak about his or her own experience with instructional technology and individual expectations for the course. The session's topics included an introduction, course overview, and a work session. The class members briefly discussed how the course, Tailoring Technology for Everyday Classroom Practice, Curricular Considerations and State Standards, might fit into the context of their particular subjects. Many had heard of Gardner, but none had had the opportunity to examine their own multiple intelligence profile, so taking a survey both illuminated the philosophical underpinnings of the State Standards and underscored the need to provide learners multiple access points to information. Next, teachers were guided through a brief, hands-on examination of how technology could assist them in myriad tasks such as: grade calculation, grade recording, classroom instructional activity design, and curriculum development, and state learning-standards implementation by perusing files which the writer had preloaded onto each computer. During this first class, it was not necessary to have personal introductions because everyone in the class knew each other. Then, beginning with the computer playing the Grateful Dead CD-ROM, participants identified the parts of, and operated a multimedia computer equipped with CD-ROM capabilities. Next, they each identified parts of, and operated a cam-corder which had been set up on a tripod to record the class. The writer distributed class roster disks to each Grade 7-12 teacher while the elementary teachers experimented with the materials on Microsoft Office (1997).

The first take-home assignment was assigned. Working with the writer and each other, each participant was to find the most accessible computer to his or her particular classroom, and print out a copy of the programs loaded on it to bring to the next class. Teachers also located the most accessible cam-corder to their classroom and found out the procedure for borrowing it for classroom use. At the end of the class, the agenda for the next class was introduced. At the end of each class meeting, participants were asked to submit a request for any particular topic of interest for the next class, and the writer prepared resources on that topic the following session.

After this initial meeting, the writer began assisting course participants with individualized help sessions during mutual free periods during the school day. She continued this practice every week during the duration of the practicum implementation phase.

That week, the writer also coordinated efforts for Web Wanderings by asking for volunteers from the graduate/in-service course to participate in the Web Wanderings initiative. She also determined which district server would host Web Wanderings and began posting experimental pages.

During month 1 of the practicum implementation, the superintendent of schools stepped down with almost no prior notice. Initially, this individual had taken an active role regarding both the form of the survey and procedures (such as requiring that the writer keep all administrators apprised of her plans in writing on a regular basis) to be followed during practicum implementation. At first, the writer was somewhat concerned that central office support would not continue for the practicum implementation, however, she was able to successfully renegotiate with the new administrator.

During the 1st week of the 2nd month of the implementation, the second 3-hour course meeting occurred after school. After an introduction by the writer and discussion of the homework from session 1, two master teachers from a neighboring district modeled low and high tech implementation of the Math Science Technology Frameworks. After an introduction about how effective instructional technology must be driven by the curriculum and is not necessarily just computers, participants solved engineering problems by building structures with large kits age-appropriate for upper elementary and middle school. Participants videotaped each other's progress, and dire threats were issued about viewing rights!

They then worked with presentational software to perform earth science and biology simulation exercises constructed by one of the guest teachers. At the end of the exercise, the teachers were given a copy of these simulations to use in their classes. Participants appreciated receiving something practical they could adapt for their students. Then, class requirements were discussed. Each Grade 7-12 teacher would submit student grades via computers at least once; the elementary teachers would construct a classroom-managing device such as a monthly calendar schedule or a grade spreadsheet with Microsoft Office (1997). All teachers would complete one project with their classes with a computer equipped with multimedia, and one class project in the television studio. The writer asked teachers to begin thinking about the type of information they wanted to include in their web pages.

During the 1st 8-hour course session the Saturday of the same week, the writer co-taught with the library media specialist. The library media specialist spent the first half of the day demonstrating electronic research materials; the OPAC and various CD-ROM reference resources. Teachers then used these tools to research topics and discussed their findings under the vigilant lens of a cam-corder. In the afternoon, the writer instructed the group and highlighted the WWW by demonstrating sites with state curriculum frameworks (BOCES, n. d.). She asked teachers to work in teams to perform a scavenger hunt to determine answers to questions about these frameworks in their particular subject areas. Finally, the writer solicited formative feedback by asking the co-teacher and participants to reflect upon what they had learned and what they still had questions about. After working with the group, the library media specialist shared her conviction that the teachers were not as sufficiently informed about electronic research materials as their students were. This corroborated the results of the writer's initial survey. Participants commented that the course had been helpful to date. Yet, the teachers requested more time to continue the work they had begun in class and voiced their frustration with the lack of administrative and technical support for technology infusion in their day-to-day practice. Also, they requested more information on state curriculum frameworks. As a result of these concerns, the writer began negotiating with the administration for more in-school training opportunities than she had originally anticipated.

During the 2nd week of month 2 of implementation, the writer began downloading more material on curriculum frameworks (New York State Education Department, n. d.). She repaired equipment in the Computer Writing Center, and reverified with the Integrade (1997) software representative about the legality of loading the program on individual machines in the school. She then began loading it on all interested teacher's school computers and ordered presentational and web page development software for teacher use. She wrote thank you notes to the neighboring district teachers who had taught session 2 of the course that all enrollees signed.

That week, the writer opened an independent study course for a technologically advanced student to assist her for the duration of the implementation. She also began a fruitless campaign which continued for the duration of the practicum to have students under her supervision who assisted teachers with technology by working on district web pages after school or during weekends receive community service credit for their efforts.

At the 3-hour sessions of the in-service/graduate course which took place that same week, participants were given instruction about the resources in the school television studio by the television/broadcast- communications teacher, and they began using the studio resources to construct class projects with their students. There was an 8-hour in-service graduate course session that weekend, and individuals worked in small groups with the writer to begin work on personal web pages. First, during the morning, the writer took each teacher's picture using a digital camera, demonstrated how to select a color for a web page background, text and links, and how to import a graphic. Each teacher set up the color scheme for a page and imported his or her photograph. During the afternoon, the writer demonstrated how to use a flat-bed scanner to bring a graphic or text into a document. Individuals worked on their personal pages for the duration of that day. That week, the writer also posted the first issue of Web Wanderings (Bing, 1997). This issue contained seasonal sites for Thanksgiving, general search resources, educational sites and pictures of the teachers who would be posting pages in the future issues. The writer also assisted an English teacher and her classes with a 3-day assignment in the computer Writing Center that week.

Week 3 of the 2nd month of implementation, the writer continued negotiating with administrators to find a way to continue training teachers during the school day. In the first plan which she proposed, each teacher would be released for one class contiguous to lunch and lunch duty every other Friday to work together in the Writing Center, library or television studio. Participants would then have an over-1-hour block of time during the day twice a month to continue. The writer submitted a mini-grant for funding for substitutes. She sent a paper copy of the first issue of Web Wanderings (Bing, 1997-98) to all of the teachers and administrators in the district with a letter explaining the project.

At the final 3-hour session of the in-service/ graduate course that met that week, teachers continued work on their individual pages; some began including such class-related items as grading policies. The writer encouraged them to think of their pages as a kind of electronic Back to School Night. Teachers also shared their class projects with each other, and the course ended as it had begun with a lively collective of ideas and experiences.

Week 4 of the 2nd month of the implementation phase, the writer began working on updating the district's web pages and helped 2 teachers build pages on them. She demonstrated how FTP programs work to them, and helped them to upload their files. She also helped plan and assist a social studies class in the Computer Writing Center as the instructor demonstrated a CD -ROM economics simulation program with a desktop projector. The writer also collaborated with the principal and an English teacher to submit a mini-grant for teachers to design assessments requiring students to utilize other materials than pencil and paper. She also assisted a mathematics teacher to begin to use the Computer Writing Center for a 2-week class project utilizing the WWW. The writer also spoke with the principals regarding the upcoming extended lunch hour training.

That week was the first and only meeting of the extended lunch hour training session. At that session, the writer reviewed the steps in creating a web page and scanning an image and saving it for use in a document. Participants concentrated on continuing work on constructing their web pages. Regrettably, only the high school principal permitted teachers to participate; the other two principals were unwilling to release their teachers because they were unable to provide substitutes.

Rather than have this training schedule become a divisive political issue among buildings, the writer was able to design a half-day, once-a-month training schedule and budget which all of the principals found amenable. She negotiated and presented it to teachers and administrators the following week, week 1 of month 3 of the practicum implementation phase.

The 1st week of month 3 of practicum implementation, the writer also devoted to constructing and posting the second issue of Web Wanderings (Bing, 1997-98) The writer located appropriate web addresses for inclusion in and built the second issue. This issue focused on different holidays in December, educational sites, and featured explanations of and links to collaborative projects. She continued working with the mathematics class for their second week in the Computer Writing Center.

Week 2 of month 3, the writer received approval for funding on both of the mini-grants which she had helped submit. That week, the writer also met with the mathematics class using the WWW in the computer writing center as they worked in the television studio preparing and presenting videos for their projects. She also participated in giving the students feedback on their work.

Week 3 was a short week due to an upcoming holiday. The writer assisted with loading software on 30 new computers installed throughout the Grade 7-12 facility, four of which were placed in the Computer Writing Center.

During week 4 of month 3, there was no school. The writer used this week to design materials for future training sessions and harvest addresses for inclusion in future Web Wanderings. Also, this time was spent preparing a flier to distribute to teachers publicizing the upcoming in-school training initiative.

During the 1st week of the 4th month of practicum implementation, the writer received official approval from the interim superintendent to proceed with in-school training for 10 teachers. A flier was sent out explaining that the first 10 respondents would receive training, and over 30 teachers responded immediately. With this proof of teacher interest, the writer renegotiated with the acting superintendent. The writer obtained copies of each of the first 20 respondents' daily schedules and put them into a data-base and a spreadsheet matrix to facilitate scheduling. Since the writer's workplace uses arena scheduling and a 9-day class rotation, sharing substitutes is complex.

By examining and comparing all of the free periods in the teacher's schedules during week 2 of month 4, the writer was able to redistribute and share the substitutes and save considerable money. She then took the first 20 respondents and divided them into two groups, novice and experienced users. Getting substitutes for entire days was less expensive than half days, so the writer designed a 5-day training timetable spread out over 5 months. The writer prepared another schedule wherein the novices would meet 5 times for a ½ day of training once a month, and the experienced users would meet for a ½ day of training 4 times once a month on alternating mornings and afternoons. Six of the 10 experienced trainees had participated in the graduate/in-service course; the other 4 were intermediate level technology users. By rotating the morning and afternoon attendance, teachers did not miss any particular class disproportionately. Most of the experienced users had been members of the in-service/graduate course and were working on projects in various stages of completion, so it seemed reasonable that they would not need as much instruction as beginners required. There would be no trainees the first 1/2 day; teacher trainers would use that time together to plan and coordinate their instruction.

The acting superintendent approved the expenditures necessary for the schedule revision, and the writer prepared instructions for instructors and participants and regret letters for those teachers she was unable to accommodate. Next, she reviewed the substitute-sharing schedule with the secretary and substitute service. That week, she continued work on updating the district web pages and built and uploaded the third issue of Web Wanderings (Bing, 1997-98). Since there were no seasonal holidays that month, the writer began featuring health-related and special sites associated with the particular month, a practice she continued for the following issues. For example, January is National Eye Care Month and National High Technology month so she was able to include links to sites with frequently asked questions, (FAQ's) about eye disease as well as educational technology resources.

During month 4, week 3 of implementation, the first meeting of Teachers-Helping-Teachers took place. In the morning, the writer explained the schedule to the other teacher trainers, and together the group decided how the sessions would proceed and how they would collaborate in teaching and supporting participants.

Besides the writer, the other teacher mentors were all master teachers chosen by her for their breadth and depth of expertise. The computer coordinator, whose responsibilities included computer infusion district wide, was also an elementary school teacher well-versed in the practices and needs of K-6 educators and the technology available in that facility. The television/broadcast- communications teacher was an expert in video composition and editing who oversaw operation of the television studio and whose teaching responsibilities were primarily within the middle school. He understood the needs of teachers and students for those particular grades. The Grades 7-12 library media specialist's expert skills included electronic information retrieval and bibliographic instruction, and she worked with those teachers and students daily. Finally, the middle and high school graphics imaging/CAD teacher's particular strengths included importing graphics, sound, and video into electronic documents.

All of the team members concurred with the writer's belief that she open each meeting with a brief overview to contextualize the session. She also included a cartoon from the 5th Wave (http://www.uexpress.com/ups/comics/fw/pages/fw980426.html) on each Teachers-Helping-Teachers agenda for the duration of the sessions; these proved to be refreshing and stimulating. The computer with Internet access in the Computer Writing Center would be connected to a desktop projector for demonstration purposes. Then, after initial presentations from each of the teacher mentors that would be staggered throughout the five training sessions, the mentors would rotate and work with participants according to their individual needs. Whenever possible, mentors circulated and helped any participant who was experiencing difficulty. Having five experts in the room working with 10 teachers expedited processes enormously. Also, working relationships developed, and if teachers experienced difficulty in any of their classrooms there was a staff member on-site who could assist them.

That afternoon, the first 1/2 day session of Teachers-Helping-Teachers took place. Since this class was the beginning group, the writer was able to reemploy some successful techniques from the in-service/graduate course. The writer introduced the course by having Dylan's (1967) "The Times They are a Changin" playing on computer CD-ROM in the background and telling them how encouraging it was to see them there. Next, she showed them Wired Magazine as example of how magazines have changed.

She turned the magazine's pages to Nicholas Negroponte's (1997) column. She then showed them his book, Being Digital (1995). Though one or two of the participants had seen Wired and heard of Being Digital, none were aware that Negroponte had been dyslexic as a child. A brief discussion ensued about how times had changed so sufficiently that dyslexia did not impede this individual from becoming both an information specialist and successful author. Next, the writer went on-line and projected Web Wanderings with a desktop projector and showed the links and teacher pages posted there as an example of an electronic information resource. Teachers began brainstorming about what to include on their individual web pages. The television/broadcast-communications teacher videotaped excerpts of the class, and the graphics imaging/CAD teacher took digital pictures of each participant for web use. The writer demonstrated how to build a page using Claris Home Page (1996) a very user-friendly, cross platform program. Participants began pages and were instructed to link to their college home pages, an authentic task to ensure that each had some hands-on time on the Web during the first session. For the second session, participants were instructed to bring a song to share and concerns about technology or wishes for topics. One participant asked for documentation on how to cite on-line resources and specific help on using software installed on the individual computers recently installed in various classrooms and offices.

During week 4 of month 4 of the practicum implementation phase, the writer began publicizing the Collegial Circle, an in-service course in curriculum design. She also worked with individual history and art teachers in the Computer Writing Center on lesson development. She also began work on Web Wanderings, issue 4 (Bing, 1997-98) February is Black History Month and American Heart Month, so she was able to include links to sites with FAQ's about heart disease as well as links to sites featuring Black History and African American heritage resources.

She also provided support to a Grade 9 special education teacher and her students as they used the Computer Writing Center to complete a two-day assignment. She presented a draft version of a district Acceptable Use Policy at the Technology Committee and was put in charge of a subcommittee to complete the document. In her continued effort to find a way to build organizational capacity for technologically adept students to become human resource support for teachers, she began inquiries with Novelle regarding their program through which high school students could become certified network technicians.

Month 5, week 1 of practicum implementation, the writer distributed a reminder regarding the Collegial Circle in curriculum design and sent reminders to teachers in both groups of Teachers-Helping-Teachers regarding their upcoming classes. She published the paper version of Issue 4 of Web Wanderings, and confirmed that substitutes had been procured for the upcoming Teachers-Helping-Teachers session. She coordinated activities for both the beginning and intermediate group with the instructors via memo and followed up with personal conversations with each since there would be no extended time for joint face-to-face planning. She prepared paper and electronic resources explaining how to cite on-line resources and asked that the computer coordinator provide a demonstration lesson on using software installed on the individual computers. She also worked with a reading teacher and her class in the Computer Writing Center and checked all of the equipment there.

During week 2 of the 5th month of implementation, both the first scheduled after school meeting of the Collegial Circle and the second meeting of Teachers-Helping-Teachers occurred. The after school group contained five participants, a majority of whom were special education and foreign language teachers. They were particularly interested in curricular redesign and ways in which students could acquire and demonstrate knowledge without using paper and pencil. The composition of the group made it possible for teams of two foreign language teachers and a subject matter and special education teacher to work together. All participants expressed a desire for Web-related class activities.

The morning of the Teachers-Helping-Teachers session, the writer met with the teacher mentors to reconfirm their plans ½ hour before the morning participants arrived. To introduce both sessions, the writer read an excerpt (Thornburg, 1996) in which the position of today's teachers as they face change of enormous magnitude is compared to their predecessors' qualms about books in the 16th century (p.96-97). She also briefly discussed a seminal work which predicted the WWW over 40 yeas ago (Bush, 1945) while distributing the requested materials on Internet citations. During the morning beginner session, participants discussed their choices of music and were shown how to play a musical CD-ROM in a multimedia-equipped computer. The graphics imaging/CAD teacher demonstrated how to digitize sound and import it into the computer. Next, teachers self-selected into groups to learn how to record grades electronically, or work with newly installed computers, or create a storyboard and video program. The computer coordinator worked in one part of the room with those teachers who wanted to learn about software installed on the individual computers. This provided sorely needed "just in time" training since 30 new computers had been installed in department offices and classrooms throughout the building during months 3 and 4 of the practicum implementation phase. Nearby, the television/broadcast- communications teacher introduced participants to the television studio and demonstrated the process of creating a video story- board; some were totally unfamiliar with working with the equipment there. Meanwhile, the library media specialist worked with another group on utilizing electronic information resources.

The afternoon group was more experienced. After the initial discussions and dissemination of Internet citation materials, these teaches immediately self-selected into groups. Participants chose to continue working on recording their grades onto disk, or scanning in students' art work and compositions as part of web page construction, or editing videos in the television studio, or harvesting electronic information resources in the library. During the afternoon expert session, a few participants also worked with the television/broadcast- communications teacher constructing a district video to be used to encourage taxpayers to vote for a bond for a separate middle school space in the secondary facility. (They completed the video in a few days, and the bond passed.) The graphics imaging/CAD teacher retook photographs of any individual who was dissatisfied with the snapshot taken at the first meeting. When they were ready, group members rotated from station to station.

Week 3 of month 5 was a school vacation. During that week, the writer continued gathering resources for future Teachers-Helping-Teachers and Collegial Circle activities and finalized the draft of the Acceptable Use Policy for the District Technology committee. The writer also designed a formative evaluation (see Appendix D) for Teachers-Helping-Teachers' participants to fill out.

When school resumed month 5 week 4, the next session of the Collegial Circle met; attendance had decreased to three individuals. In retrospect, all agreed that participants had been unrealistic when they scheduled the Monday after a vacation for a meeting date. The writer demonstrated a web site on Different Ways of Knowing, (http://www.dwoknet.galef.org) and those who attended began exploring web-based foreign language projects and special education sites. That week, the writer also disseminated the Acceptable Use Policy among the staff for any final comments. A middle school science class met in the Computer Writing Center to watch Internet coverage of the eclipse occurring that day.

Month 6, week 1 was the third meeting of Teachers-Helping-Teachers. The writer began with a recent commentary extrapolating how future computer chip power and cost-time projections will affect school expenditures (Moursund, 1998). By this time, everyone in both the beginning and advanced groups had been introduced to the basics of using a multimedia- equipped computer with CD-ROM capabilities, electronic resource retrieval, web page construction, and operating a cam-corder and the equipment in the television studio. After an initial session in which the writer demonstrated more techniques for web page construction and sample teacher and student web pages, next the graphics imaging/CAD teacher demonstrated the basics of editing an image and capturing a sound file onto disk. Participants were given formative evaluations to complete and return within a week. Then, teachers self-selected into small groups led by each mentor. The computer coordinator gave participants one-on-one coaching on individual computers in different locations. The library media specialist helped other individuals to downloaded actual web page samples and compare different search engine's retrieval of subject area content. The television/broadcast- communications teacher worked with individuals on video editing, and the writer worked with individuals on the Integrade Pro(1997) grading program. People were free to stay with one group or move to another when they chose. Individuals chose to work wherever they felt they needed to spend more time. This session was particularly helpful because individuals could address the areas in which they needed the most attention.

That week, the writer also began work on the next issue of Web Wanderings. March is American Red Cross, National Women's History, and Irish-American Heritage month, so issue 5 showcased them. By this time, eight teachers had built web pages linked to this issue.

During the 2nd week of the 6th month of the implementation phase, the writer went to individual computer sites within the building and followed up on training individuals had received the week before. While assisting the teachers, she also interviewed them for anecdotal formative evaluation on the training and loaded specific software that course participants requested. That week, she also posted Web Wanderings and sent out reminders for the Collegial Circle.

During week 3 of month 6 of implementation, the writer assisted the reading teacher and her class as they used the Computer Writing Center for a 2 day project. The writer also began compiling and analyzing the formative evaluations of Teachers-Helping-Teachers. The writer also assisted a special education teacher as she began designing an electronic-parallel social studies assignment for Grade 10. Spanish 3 students worked with the writer in the Computer Writing Center to find web sites on topics their teacher had assigned. With the help of students, the writer also began updating the district's web pages. That week's Collegial Circle focused on foreign language and history sites as examples of web-based primary sources; participants searched for Web sites they could integrate with their curriculum.

The next week, week 4 of the 6th month, the writer began intensive work with the French and Spanish teachers. Their goal was to combine the use of the WWW with their courses by designing classroom projects that required students to access primary electronic sources and reconstruct their knowledge in other media besides pencil and paper. The writer also continued helping the special education teachers find ways to use the WWW to accommodate students' learning modalities. She continued reconstructive work on the district pages, and the acting principal was shown the teachers' progress to date. At that week's Collegial Circle, participants continued designing classroom tasks utilizing sites they could integrate with their curriculum.

The 1st week of month 7 of the practicum implementation phase, the writer continued her intensive work with the Spanish and French teachers. That week, seven computers in the Computer Writing Center's network were connected to a T1 line, and it became possible to access the WWW at all of those stations. The writer assisted the teachers to design integrated lessons. First, they created and stored word-processing documents with the class assignments on the computers in the Computer Writing Center, then they bookmarked related WWW sites and stored them on the computers with T1 access . Finally, they made sure that each student had returned an Internet Permission

Slip signed by their parents. At that week's final Collegial Circle meeting, participants shared their activity designs with each other and provided feedback and suggestions.

Week 2 of the 7th month of implementation, a Spanish 1 class met in the Compute Writing Center for 3 days. The writer had a small class of English 12 honors which met that period, and she was able to arrange her class's schedule so that the students were viewing the video of Man of La Mancha (1991) as a culmination of their study of Cervantes. Though the accommodations were a bit tight, the two classes met together and the video provided an appropriate background as the freshman and sophomores examined La Red, the Spanish name for the WWW, with the writer and their Spanish teacher assisting them. The writer also posted the next issue of Web Wanderings.

Week 3 of the 7th month of implementation, there was no school. The writer prepared for the next session of Teachers-Helping-Teachers which was scheduled for the following week, and finalized the details of the lesson which the French teacher had planned to deliver in the Computer Writing Center week 4 of month 7.

The 4th week of month 7, the Computer Writing Center hosted both Teachers-Helping-Teachers and a French class. The students in French class concentrated on sites dealing with maps (http://www.franceway.com) cuisine and hotels (http://www.urec.fr/France/) and utilized word-processing to reconstruct their findings.

During the session of Teachers-Helping-Teachers that occurred that same week, the writer began by sharing the results of the formative evaluation which participants had submitted. Teachers indicated a strong preference for continuing their projects on the WWW (see Appendix D).

The writer next demonstrated three quick methods for harvesting information while on line: printing a web page while on line, having a connection to the WWW and a word-processing document open simultaneously and transferring information from one to the other by using the alt,tab key combination, and saving the page as a file. Teachers were equally delighted with the ease of these procedures and concerned about the ethical implications and intellectual property issues that instantly emerged. This led to renewal of an ongoing discussion topic among participants, i.e.electronic copyright and fair use issues. During this session, the writer introduced the Internet Pyramid model (Johnston, 1997/1998) as a way for participants to consider the learner skills necessitated by educational Internet activities. This model posits that students must begin by mastering basic skills such as examining a functional web site within the context of a classroom activity before they can progress on to more complex tasks such as e-mail search engines, group research, and individual activities such as keypal projects or independent research (p. 37).

This session occurred the day after a highly publicized demonstration of Windows 98 by B. Gates had crashed, which was a wonderful introduction to a consideration of the advantages and disadvantages of technology infusion for busy teachers with crowded curricula. Next, participants were given Harris' (1997-98 p. 15) criteria for evaluating whether using the Internet merits the extra class and planning time necessitated. Learners then went on-line and examined networked-based educational activity structures (Harris, 1997). The remainder of the session was devoted to exploration and evaluation of these sites. Participants practiced the skills demonstrated by the writer by retrieving and downloading a web lesson evaluation form (Johnson, 1997). While on-line, they toggled back and forth from the Internet to a word-processing program. They then began filling out web evaluation forms in separate documents and saving and printing them. By the end of the class, they had each located some that could be tailored for their specific classes.

Month 8, week 1 of practicum implementation, the writer began working intensively with a social studies teacher to structure a culminating learning activity for a course on the holocaust. While students were finishing propoganda posters, the writer shared three articles with their teacher: one about teaching students how to critically evaluate the information contained in web sites for bias and credibility (Marcovitz, 1997), one describing a 6-year, international, collaborative, telecommunication-student project to end genocide (Kern, 1997), and a review of several holocaust web sites written by a student participant from the collaborative project (Frisina, 1997). Next, she gave the teacher Internet permission slips for her students to submit. Then they examined several Holocaust web sites that the writer had pre-selected. Together, they decided that the students would be put into teams, and each team would do a peer review of one of the yearly publications produced by the international student collaborative. The writer created peer review forms, loaded them onto the computers in the computer writing center, and book-marked the yearly publications.

That week, the writer also began working with high school teachers who wished to have their AP classes post pages of their work after they had taken the AP examination and started scheduling the Writing Center for those activities. The writer also prepared a summative evaluation form for Teachers-Helping-Teachers (see Appendix E) since the final session was to meet the following week.

Week 2 of the 8th month of practicum implementation, the final meeting of Teachers-Helping-Teachers was held. Fruit, cookies, and juice were provided by the writer. The writer began this class by reading from a book celebrating the efforts of public educators in America. (Rose, 1995), and another which describes the phenomena of the virtual community (Rheingold, 1993). Finally, she returned Negroponte's (1995 p. 240), with whom she had begun the sessions, description of "global cottage industries' which the Web fosters.. She thanked all of the teachers for working so hard on all of their projects for the duration of the school year. This last class began with a demonstration by the writer of how to bookmark a site and how to organize bookmarks into folders. Each teacher was instructed to create a bookmark folder and label it with his or her name. Next, they were shown a collection of general and subject-specific bookmarks the writer had harvested (Bing, 1998). Learners spent the remainder of the class choosing useful sites and storing them in their folders. At the end of the class, they copied their folders onto floppy disks they took with them to load on to their personal and school computers. The writer also distributed the summative evaluation forms(see Appendix E) and asked participants to complete and return them.

The 3rd week of the 8th month, the writer and a Spanish teacher met with the acting Superintendent. The teacher had asked the writer to try and design a summer in-service course as a way for interested teaches to continue the work they had begun during the school year. She posted the next issue of Web Wanderings (Bing, 1997-98). Issue 7 emphasized things we remember in May, Mother's Day, Cinco de Mayo, and Memorial Day, and featured the 8th-grade Foreign Language/Art pages, an interdisciplinary collaborative effort of four classes. She worked on another revision of the Acceptable

Use Policy for the Technology Committee. She helped the Spanish teacher and the Spanish AP class to build web pages featuring highlights of their trip to Spain and continued this effort for the duration of implementation. She continued work with the social studies teacher on the holocaust project by helping her select the web pages that her students would evaluate, and together they determined the content to be included on the student-built web page. She also helped coordinate a schedule for the science teaches to use the Computer Writing Center for their AP students to design and post web pages and began work on the final issue of Web Wanderings. She also prepared and distributed another version (see Appendix F) of the data-gathering instrument she had administered in the fall (see Appendix A) to all the teachers to evaluate the progress of her solution strategy implementation..

The next week, the 4th in month 8, the writer began preparation for a summative report on her activities to be presented at a Board of Education meeting the following month. She began tabulating the summative evaluations from Teachers-Helping-Teachers and continued work with the Spanish AP class on their web page and on Web Wanderings.

Week 1 of month 9 brought very heartening news. One of the Spanish teachers with whom the writer had worked submitted the lessons she had developed with the writer during week 2 of the 7th month as a proposal for the IDEAS session of the annual meeting of the American Association of Teachers of Spanish and Portuguese. After canvassing the faculty and administrators, the writer determined that it would be more feasible to continue training initiatives the following fall than the same summer. The writer continued helping the Spanish and science AP classes with their web pages and adjusted the district web pages and links and the final issue of Web Wanderings. She worked in the television studio editing footage of the year's activities for her summative report.

The next week, the final issue of Web Wanderings was posted and published. The June Issue (Bing, 1997-98) highlighted graduation, Flag Day and Father's Day and included special thanks to the Teachers-Helping-Teachers mentors. The writer helped all teachers and students finish their work on their web pages, and helped them post them on the district pages. She prepared a multimedia presentation for the summative report.

The final week of practicum implementation, week 3 of month 9, the writer presented her summative report to the district at the Board of Education meeting. Many of the students and teachers who had participated in building web pages were present. At that meeting, she thanked all of the district personnel and students for their participation. She sent a thank you note to the teachers who had assisted her in the Teachers-Helping-Teachers initiative, and to the administrators. She met with the district administrators to plan for the following school year's efforts

CHAPTER V

RESULTS

Results

The problem to be solved in this practicum was that teachers' and students' needs for a broad range and scope of educational activities utilizing current instructional and research methodology and materials weren't being accommodated. To meet the identified teacher and student needs for a broad range and scope of educational activities utilizing current instructional and research methodology and materials, the writer delineated and implemented a solution strategy. Teachers and their students would receive ongoing training and support from local experts. They utilized current instructional and research methodology and materials to experience a broad range and scope of educational activities. Individuals' skills were developed, instructional resources were provided, and organizational capacity was augmented simultaneously in the writer's plan. Credit-bearing and release-time opportunities provided incentives for teachers to explore current paradigms and resources. The writer enabled teachers to receive the training, time, and support for learning to use the current instructional-research methodology and materials by continually consulting and dialoging with district administrators and the teachers union to ensure their support for implementation activities.

The following outcomes were projected for this practicum:

Outcome 1 stated that of the 30 targeted secondary and elementary teachers, at least 15 will utilize the resources of CD-ROM multimedia materials to teach a class by the end of month 7 of implementation as measured by sign- in logs in computer facilities and observations.

This outcome was met.

All 9 participants in the graduate/in-service course, and 13 additional Teachers-Helping-Teachers' participants completed tasks involving utilizing the resources of CD-ROM multimedia materials with their students. As teacher and facilitator of the graduate/in-service course and Teachers-Helping-Teachers, and facilitator of the Computer Writing Center, the writer personally observed these 22 teachers as they demonstrated their skills. Sign-in logs have revealed that 5 additional teachers have used CD-ROM multimedia materials with students in other computer facilities. These measurements demonstrate that a total of 28 teachers successfully utilized CD-ROM multimedia materials with their students.

Table 5

Teachers Successfully Utilizing the Resources of CD-ROM Multimedia with Classes (June, 1998)

Data Source	Teachers (n=28)
Graduate/in-service course	9
Teachers-Helping-Teachers	13
Sign-in Logs	5

Though several of the teachers trained began as novices, their skills utilizing CD-ROM multimedia materials with their students increased markedly. For many learners, attaining this competency was the main motivation for signing up for the course or workshop(s). This capability provided a foundation of basic knowledge for learners so that they could master more difficult tasks, and these skills were reviewed in almost every work session. Also, during the same time period as implementation occurred, many teachers received new computers equipped with CD-ROM multimedia materials in their classrooms making this an opportunity for just in time training. The fortuitous timing of the arrival of new equipment piqued more teachers' interest in honing their skills with CD-ROM multimedia with their classes.

Outcome 2 stated that of the 30 targeted secondary and elementary teachers participating in the graduate/in-service course or Collegial Circle, at least 15 will demonstrate competency by accessing and utilizing the resources of the WWW to explore at least three educational sites with their students class by the end of month 6 of implementation as measured by observations and librarian's records.

This outcome was met.

The writer personally observed all 9 teachers participating in the graduate/in-service course and one additional Collegial Circle participant successfully demonstrate the use of a Web Browser to their students as part of a lesson. Also, the librarian's records indicate that 8 additional Teachers-Helping-Teachers' participants demonstrated these capabilities. These measurements indicate that 18 teachers demonstrated competency accessing and utilizing the resources of the WWW. Yet, according to the data gleaned from question 3 of the Summative Evaluation data from Teachers-Helping-Teachers (see

Appendix E), this outcome was not met. In this measurement, only 9 teaches stated that they had used the WWW as part of an instructional activity. However, only a total of 12 teachers completed this form, so results from it were incomplete.

Table 6

Teachers Successfully Utilizing the Resources of the WWW with Classes (June, 1998)

Data Source	Teachers (n=18)
Graduate/in-service course	9
Collegial Circle	1
Librarian's records	8

Among the teachers participating in this endeavor, interest in using the WWW with their students was high from the beginning to the end of implementation. Also, the fact that T1 Internet access became available during this project positively impacted on this outcome's results. As soon as this line was installed, four computers in the library and six computers in the Computerized Writing Center had fast Internet access, making it possible for groups to work at different sites on the WWW simultaneously. Teacher competency and resource availability had increased simultaneously. Within 2 days of the line's installation, teachers and their classes were using it.

Outcome 3 stated that at least 5 English, social studies, or foreign language teachers will demonstrate competency utilizing the resources of the computerized writing center by teaching a class there by the end of month 7 of practicum implementation as measured by observations and sign-in logs.

This outcome was met.

The writer personally observed and, wherever possible, assisted teachers as they brought their classes to the computerized writing center. Two English teachers used the writing center for an extended writing project, and one social studies teacher used the center for a CD-ROM-based economics simulation. Another social studies teacher used the center for an extended Web-based holocaust project. Two foreign language course participants used the center for extended Web-based lessons and for building Web pages to publish class work. These measurements indicate that 6 English, social studies, or foreign language teachers demonstrated competency utilizing the resources of the computerized writing center.

Since much training occurred in this facility, teachers became very familiar with using the equipment there. Thus, their technophobia was allayed, because they had so much practice using the facility. They were reasonably confident that they could use the resources effectively with a class, and they knew that the writer would help them design their lessons and pretest their lessons. So, using the facility was far less risky under these conditions. As other teachers observed the center being used successfully by their colleagues, they were encouraged to experiment with it themselves.

Outcome 4 stated that at least 10 of the 30 targeted secondary and elementary teachers participating in the graduate/in-service course or Collegial Circle will utilize the resources of the district computer facilities by teaching a class in one of them by the end of month 7 of the practicum as measured by observations and sign-in logs.

This outcome was not met.

The original intent was for graduate/in-service course or Teachers-Helping-Teachers or Collegial Circle participants to teach a class in one of the district computer facilities and to record that lesson on videotape for evaluation by other course and/or Circle members, the writer, and other course teachers. The timetable for district networking was delayed. Most other district computer facilities either still were not networked, or did not contain Internet access and/or Windows 95 software. Teachers did not use the other labs for practicum-related work, instead they used library and computerized writing center equipment. Though teachers were using technological resources more frequently, they weren't using these particular facilities for the tasks described in this report because the equipment therein was inadequate. When pending upgrades and networking are completed, this situation should change. Teachers would far prefer to use facilities close to their classrooms rather than taking instructional time to travel with their students to the computerized writing center or the library.

Outcome 5 stated that at least 5 teachers will utilize the resources of the TV studio by teaching a class there by the end of month 7 of the practicum as measured by observations and sign-in logs.

This outcome was met.

Observations and sign-in logs were the evaluation tools for this outcome. The writer observed 1 teacher and the television/broadcast- communications teacher observed 5 teachers successfully instruct students in the use of the equipment in the TV studio. These measurements indicate that 6 teachers and their students have produced and submitted a class-related videotapes in the TV studio.

According to the results of the Teachers-Helping-Teachers Summative Evaluation, (see Appendix E) this outcome was realized. Of the 12 respondents, 8 stated that they had utilized the resources of the school television studio in a classroom-related activity. Since only 12 teachers returned this form, the results from this data instrument are not complete. Also this instrument does not define what constitutes "utilizing the resources of the school television studio in a classroom related activity".

Though individual teachers were universally interested in learning to use computers equipped with multi-media CD-ROM and WWW applications, their desire to work in the television studio was bipolar. Those who wanted to use this resource with their students were extremely interested and spent a great deal of time working in this facility. Others were far more interested in the CD-ROM and WWW components of training opportunities.

Outcome 6 stated that of the 30 targeted secondary and elementary teachers participating in the graduate/in-service course or Collegial Circle, at least 15 will retrieve current information by the end of month 7 of the practicum by accessing and utilizing the electronic library resources of CD-ROM data-base research materials in at least one class project as measured by observations and librarian's records

This outcome was met.

The writer personally observed all 9 teachers participating in the graduate/in-service course and 1 additional Collegial Circle participant successfully demonstrate the use of CD-ROM data-base research materials to their students as part of a lesson. Additionally, the librarian's records indicated that 8 more Teachers-Helping-Teachers' participants demonstrated these capabilities. These measurements indicate that 17 teachers demonstrated competency accessing and utilizing the electronic-library resources of CD-ROM, data-base, research materials in at least one class project.

Table 7

Teachers Successfully Demonstrating CD-ROM data-base research to Their Classes (June, 1998)

Data Source	Teachers (n=17)
Graduate/in-service course	9
Collegial Circle	1
Librarian's records	7

The installation of the T1 line making it possible for groups to work at different sites on the WWW simultaneously brought more classes into the library. However, though more teachers and students researched electronically in the library, not all students could be on the WWW simultaneously. Teachers then encouraged students to use the CD-ROM, data-base, research materials. Thus, more individuals also worked successfully with these other electronic-research materials. So, learners were enabled to take advantage of alternative up-to-date materials when their first choice (the WWW) was temporarily unavailable.

Outcome 7 stated that of the 30 targeted secondary teachers and elementary teachers participating in the graduate/in-service course or Collegial Circle, at least 5 teachers will successfully use a cam-corder as part of an instructional activity by the end of month 5 of implementation as measured by observations and equipment sign-out.

This outcome was met.

Five teachers successfully used a cam-corder as part of a lesson for evaluation by the writer or television/broadcast- communications teacher. Equipment sign-out records also indicated that nine more teachers borrowed cam-corders for classroom use during the first 5 months of implementation bringing the total to 14. However, this usage was not monitored; borrowing equipment can not be included as proof of competency.

Many creative uses of cam-corders emerged. For example, the football coach made videotapes of athlete's performances to send to college recruiters, and the art teacher used videotape to archive student portfolios. Student teachers used videotapes of their lessons for self-evaluation purposes. Also, the district facilitated usage of cam-corders by hiring an assistant to process and distribute equipment 2 periods a day during month 3 of implementation.

Outcome 8 stated that of the 30 targeted secondary and elementary teachers participating in the graduate/in-service course or Collegial Circle, at least 10 teachers will design and implement an assignment requiring their students to utilize materials other than paper, pen, or pencil, by the end of month 7 of the implementation as measured by observations and submissions to the district web pages.

This outcome was not met.

Attaining this outcome was the most difficult and time-consuming because it required synthesis of the curriculum, the technology, skill with building web pages, and access to the district web site. Only 6 classes posted their work to the district web site during the implementation time period. In a related outcome, according to the results of the

Teachers-Helping-Teachers Summative Evaluation, (see Appendix E) 11of the 12 teacher respondents stated that they had posted personal web pages on the district web site. In actuality, the writer observed that there were 13 teacher's pages posted on this site during practicum implementation. Of course, a teacher posting a personal page is a less involved task than a class posting its work; yet, it is a step toward achieving the objective of class - related postings. By posting their own pages, teachers gained the knowledge and confidence to perform this task with their students, and all were novice web page creators when implementation began.

The installation of the T1 Line and the availability of more computers with Internet accessibility in the library and the computer writing center also positively affected these results. The writer considers 6 class-related web pages and 13 teacher-web pages a promising beginning, and is confident that this outcome will be realized in the next school year.

Outcome 9 stated that at least 15 of the 30 targeted secondary and elementary teachers participating in the graduate/in-service course or Collegial Circle and their students will gain experience with using search engines and citing at least 3 electronic documents by the end of month 7 of implementation as measured by observations and librarian's anecdotal records.

This outcome was met.

The writer and the librarian personally observed all 9 teachers participating in the graduate/in-service course demonstrate the use of search engines, and the citation of electronic documents to their students. Additionally, the librarian's records indicate that 7 more Teachers-Helping-Teachers' participants demonstrated these capabilities. These measurements indicate that 16 teachers demonstrated competency demonstrating the use of search engines, and how to cite electronic documents to their students.

Table 8

Teachers Successfully Demonstrating Electronic Citation to Their Classes (June, 1998)

Data Source	Teachers (n=16)
Graduate/in-service course	9
Librarian's records	7

Again, the installation of the T1 Line and the availability of more computers with Internet accessibility in the library and the computer writing center also positively affected these results As library-based electronic research projects grew in number, usage of electronic documents increased. Participating teachers also demonstrated their desire teach the proper citation format by requesting that the writer teach it to them during the graduate/in-service course and workshops.

Outcome 10 stated that at least 10 of the 30 targeted secondary and elementary teachers participating in the graduate/in-service course or Collegial Circle will demonstrate competency with computer software in classroom management by successfully using a computer application for grade-and-attendance keeping as measured by administrative records.

This outcome was met.

Administrative records indicated that 10 different teachers achieved that competency. Some teachers, however, tried it once and decided using computer software for some of these tasks was more time-consuming than their accustomed paper-and-pencil methods. Others used the software intermittently. Only 4 teachers actually used this method for every grading period after they learned it. Because they did not have constant access to a computer, most of the teachers kept a paper grade book as well as their electronic one. So, for them, this was double bookkeeping. Teachers seemed very apprehensive about discontinuing the practice of maintaining paper grade books. Except for those who had similar computer systems at home and at school, participants felt that electronic grade books were not as convenient and reliable as their paper predecessors. Also, the learning curve for the software was challenging to some. Teachers did not use this software daily, and some felt frustrated at grade-reporting time when they did not remember the steps they had learned for setting up electronic grade books and averaging grades. Teachers who continued using their paper grade books for recording and averaging and simply used the software program instead of filling in bubble sheets for grades were the most satisfied and the most likely to continue using this method. Fourth quarter marking is most complex involving a quarterly, final exam, and yearly grade; and only 5 teachers used the electronic method when it involved multiple averages further supporting the hypothesis that most teachers were still using grade books in addition to the software. The main reason for including this task in the practicum outcomes was to insure that teachers would have a personal reason to keep using technology consistently, and it did fulfill that purpose for some participants. Also, several other teachers have expressed interest in learning this software for the upcoming school year.

According to the results of the Teachers-Helping-Teachers Summative Evaluation however (see Appendix E), this outcome was not realized. Only 4 of the 12 respondents stated that they had submitted grades and progress reports without using bubble sheets. Since only 12 teachers returned this form however, the results from this instrument are incomplete.

Table 9

Teachers Using a Computer Application for Grade and Attendance Recording (June, 1998)

Grading period	First time users (n=10)
Quarter 1	6 of 9 using
Quarter 2	2 of 6 using
Quarter 3	1 of 6 using
Quarter 4	1 of 5 using

The writer gleaned more information from comparing pre (see Appendix A) and post surveys (see Appendix F). It is, however, important to remember that although these instruments ask the same questions, they do not contain the same sampling of respondents; 51 teachers complete the pre survey and 35 completed the post survey. To aid comparison, the writer extrapolated percentages that she included next to the raw numbers below. Also it must be kept in mind that respondents did not identify themselves by name, so one can not assume that the same individuals completed both questionnaires.

The following numbers do yield some data, however these comparisons are inconclusive. When answering number 13 in the pre treatment questionnaire (see Appendix A), 7 (14%) of 51 reported that they "always", "almost always", or "sometimes", use a local or school library computer to access the Internet. When answering the same question in the post treatment questionnaire (see Appendix F), 13, (37%) of 35 respondents reported that they always", "almost always", or "sometimes", use a local or school library computer to access the Internet.

When answering number 15 in the pre treatment questionnaire (see Appendix A), 35 (69%) of 51 respondents, reported that they always", "almost always", or "sometimes", allow students to cite Internet sources in papers and for projects. When answering the same question in the post treatment questionnaire (see Appendix F), 27 (77%) of 35 respondents reported that they always", "almost always", or "sometimes", allow students to cite Internet sources in papers and for projects.

When answering number 16 in the pre treatment questionnaire (see Appendix A), 31 (60%) of 51 respondents reported that they always", "almost always", or "sometimes", use district technology facilities. When answering the same question in the post treatment questionnaire (see Appendix F), 24 (69%) of 35 respondents reported that they "always", "almost always", or "sometimes", allow students to cite Internet sources in papers and for projects.

The data suggest that there was an increase in teacher and student usage of electronic media for information retrieval and presentation. Teachers increased their use of CD-ROM multimedia materials, educational sites, and search engines on the WWW, electronic document citation, the library resources of CD-ROM data-base research materials, and the TV studio with their students. Though it was time-intensive, teachers and their classes enjoyed posting web pages related to class work Though teachers utilized electronic means for record-keeping, this was not as helpful to them as had been anticipated. Teachers were generally most interested in enhancing their classroom-related WWW skills, though some were very interested in TV studio utilization.

Discussion

According to Moursund (1997/1998) effective professional development in information technology should address curriculum, instruction, and assessment in all subjects, and be customized to address individual teacher's specific concerns and current ability and usage levels. Anecdotal information gleaned from the formative and summative evaluations of Teachers-Helping-Teachers (see Appendices D and E) overwhelmingly supports this contention. Teachers found the individual attention and personal support most helpful. It was interesting to note that as the writer and master teachers assisted their colleagues, some teachers needed constant positive encouragement to help them with their anxiety about technology. Others' questions and problems were about how to integrate technology into a particular lesson or problematic part of the curriculum. Still others were totally independent and preferred to collaborate with the mentor only if a problem arose. No matter which learning orientation each teacher preferred, the most important service the mentor provided was to facilitate that individual's unique needs and process.

As training progressed, teachers were most interested in developing Web-based resources for their students. Though this work is most time-intensive, the writer is hopeful that teachers will continue with their endeavors. Some future results of this project are certain to occur. The Spanish teacher with whom the writer had worked was asked to present the Web-based lessons she developed at the IDEAS session of the annual meeting of the American Association of Teachers of Spanish and Portuguese in Madrid, Spain during the summer of 1998. As a result of the training she received in the television studio, 1 teacher is starting a middle school video club in the fall of 1998. Several teachers have requested that on-going training continue beginning the first 2 days of school in fall, 1998.

Recommendations

It is essential that all of the stakeholders, administrators, teachers, and support staff be committed to devoting time and resources to make a program with as broad a base as this one effective. Also, a cadre of flexible, expert teachers who are committed to helping their colleagues and who can work cooperatively is essential for success. Learning partnerships with students make sense both to facilitate processes and build learning communities. Students should be recognized for their contributions and also be provided with incentives to participate Finally, the computer, network, and television equipment must be adequate to the tasks outlined, and the political climate of the district must be stable enough to support such an endeavor.

Dissemination

The writer has submitted a presentation proposal session in which she will discuss some of her practicum activities for the Tel Ed '98 Conference. International Society for Technology in Education (ISTE) has invited her to present a 60-minute session there. The writer is also considering submitting an article to ISTE's quarterly journal for technology coordinators, Connections, because it examines challenges and solutions in staff development

REFERENCES

ARTT. (1997). Academic house calls. Academic Resources For Technology. [on-line]. Available: http://darkwing.uoregon.edu/ ~als/tep/library/edtech/incrfac. html. [1997, January 10].

Angell, D. (1996, September). Art of the web plan. Internet World, 42-44.

Angell, D. (1996, September). Safe computing: Seven programs that filter Internet access. Internet World, 49-58.

Armstrong, T. (1994). 7 kinds of smart New York, NY: Pengiun Books.

Ayersman, D. J. (1996). Reviewing the research on hypermedia-based learning. Journal of Research on Computing in Education, 28(4), 500-525.

Bedford, D. R. , Levine, G. , Osterman, K., Walsh, M. , MacDonell, C., & Wojciechowski, K. (1996). A review of the remedial and advanced instructional programs in the School District . Westhampton Beach, NY: Sufolk B.O.C.E.S. Division of Instructional Support, Planning and Technology.

Bing, J. (1997-98, June 12, 1998). Web Wanderings, [on line]. Gajewski, T. Available: http://www.li.net/~royals/wander_main.html. [1997-1998]

Bing, J. (1997/98, June 12, 1998). Web Wanderings, [World Wide Web] Gajewski, T. Available: http://www.li.net/~royals/wander_june.html. [1998, June 1].

Bing, J. (1997/98, June 12, 1998). Web Wanderings, [World Wide Web] Gajewski, T. Available: http://www.li.net/~royals/rainbow.html. [1998, June 1].

Board of Education. (1995). Joining the Renaissance (annual goals and objectives).

Board of Education. (1996). Policy book U.F.S.D.#6

BOCES, P. W. C. (n.d.). Developing educational standards. [on-line]. Available: URL http://putwest.boces.org/Standards.html. [1996, September 5].

Boling, E. , & Kirkley, S. , (1996). Helping students design World Wide Web documents. HyperNexus Journal of Hypermedia and Multimedia Studies, 6(4), 13-18.

Boyers, K. (1996). Reach out and teach someone. *Association Management, 48,* 41-48.

Brush, T. (1997). The effects on student achievement and attitudes when using integrated learning systems with cooperative pairs. *Educational Technology Research and Development, 45*(1), 51-64.

Bush, V. (1945, July). As we may think. *Atlantic Monthly,* [on-line].Available: http://www.theatlantic.com/unbound/flashbks/computer/bushf.htm. [1997, February 5].

Carter, K. (1997). Who does what in your district and why. *Technology and Learning, 17*(7), 30-36.

Chisholm, I. (Winter,1995-96). Computer use in a mulitcultural classroom. *Journal of Research on Computing in Education, 28*(2).

Claris Home Page: For Macintosh and Windows (Version 2.0) [Computer Software]. (1996). Santa Clara, CA: Claris Corporation.

Cuban, L. (1986). *Teachers and machines: The classroom use of technology since 1920.* New York: Teachers College Press.

Darling-Hammond, L. (1996). What matters most: A competent teacher for every child. *Phi Delta Kappan, 78*(3), 193-200.

Dede, C. J. (1993a). Empowering environments, hypermedia and microworlds. In T. R. Cannings & L. Finkle (Eds.), *The technology age classroom.* Wilsonville, Oregon: Franklin, Beedle & Associates Incorporated.

Dede, C. J. (1993b). The future of multimedia: Bridging to virtual worlds. In D. M. Gayeski (Ed.), *Multimedia for learning.* Englewood Cliffs, New Jersey: Educational Technology Publications.

Dylan, B. (1967). *The Times They Are a Changin' Bob Dylan's Greatest Hits,* [CD-ROM]. CBS, Inc. CBS Records.

Dwyer, D. (1996) Preface. In C. Fisher, D. Dwyer, K. Yocam, (Eds.), *Education and technology: Reflections on computing in classrooms.* San Francisco: Apple Press.

Dyrli, O. (1994). District wide technology planning: The key to long-term success. *Technology & Learning, 14*(7), 50-56.

Dyrli, O., & Salpeter, J. (1997). Internet stats making news. *Technology and Learning, 17*(7), 55.

Edgar, C. (Ed.). (1996). The nearness of you: Students & teachers writing on-line. New York: Teachers & Writers Collaborative.

Elam, S., Rose, L., Gallup, A. (1996). The 28th annual Phi Delta Kappa/Gallup poll of the public's attitudes toward the public schools. Phi Delta Kappan, 78(1), 41-59.

Fisher, C., Dwyer, D., Yocam, K. (Ed.). (1996). Education and technology: Reflections on computing in classrooms. San Francisco: Apple Press.

Frisina, D. (1997). These World Wide Web sites can help you. Journal of Online Learning, 9(1), 6-8.

Froese-Germain, B. M., M. (1997). The impact of technology on teaching and learning: Social, cultural and political perspectives, Critical Issues In Education And Technology Series No. 1 [on-line]. Available: http://www.ctf-fce.ca/ctf/restech/critical.htm. [1997, March 5].

Garcia, J., Weir, B., Leash, P., Hunter, R. (1972). Truckin'. Hundred year haul, [CD-ROM]. Grateful Dead Producations, Inc. Arista Records.

Gardner, H. (1995). Reflections on multiple intelligences: Myths and messages. Phi Delta Kappan, 77(3), 200-209.

Gayeski, D. M. (1993). Making sense of multimedia: Introduction to this volume. In D. M. Gayeski (Ed.), Multimedia for learning. NJ: Educational Technology Publications.

Global School Network. (1997). A visit to Hillside School. [On-line] Available: http://www.gsn.org/web/tutorial/intro/visit.htm. [1997, January 3].

Grégoire, R., Bracewell, R., & Laferrière, T. (1997) The contribution of new technologies to learning and teaching in elementary and secondary schools. [on-line] Available: http://www.tact.fse.ulaval.ca/fr/html/impactnt.html. [1997, January 10].

Griest, G. (1996). Computer education as an obstacle to integration and internetworking. Learning and Leading With Technology, 23(7), 31-39.

Grow, G. (n. d.). Writing and multiple intelligences [on-line]. Available: http://168.223.2.3/sjmga/ggrow/ 7In/7IntelIndex.html #anchor510335. [1997, January 3].

Hall, A. (1997). Technological enhancement of teaching and learning [on-line]. Available: http://www.per. ualberta.ca/ tech/ assume.htm. [1997, January 6].

Harris, J., Grandgenett, N. (1996). Correlates among teachers' anxieties, demographics, and telecomputing activity. Journal of Research on Computing in Education, 28(3), 300-317.

Harris, J. (1997, July 7, 1997). Judi Harris' Network-Based Educational Activity Collection, [on-line]. Available: http://lrs.ed.uiuc.edu/Activity-Structures/. [1998, March 3].

Harris, J. (1997-98). Wetware:Why use activity structures. Learning and Leading with Technology, 25(4), 13-17.

Hawkes, M. L. (1996, October, 1996). Evaluating school-based distance education programs: Some thoughts about methods. Bulletin, 80, 26-31.

Heider, J. (1986). The tao of leadership: Lao Tzu's Tao Te Ching adapted for a new age. New York, NY: Bantam Doubleday.

Heinich, R., Molenda, M., Russell, J. D., & Smaldino, S. E. (1996). Instructional Media and Technologies for Learning. (fifth ed.). Englewood Cliffs, New Jersey: Prentice - Hall.

Heller, A. (Producer), Heller, A. (Director). (1991). Man of La Mancha. [Film]. [MGM/UA Home Video] (Available from United Artists, Culver City, CA).

Ingram, A. L. (1996). Teaching with technology. Association Management, 48(6), 31-38.

Integrade Pro (Version 3.01) [Computer Software] (1997). Mesa, AZ: National Computer Systems, Inc.

Johnson, D., Johnson, R. (1996). Cooperation and the use of technology. In D. Jonassen (Ed.), Handbook of educational communications and technology: A project of the association for educational communications and technology (pp. 1017-1044). New York: Simon & Schuster Macmillan.

Johnson, L. (1997). Web lesson evaluation form, [on-line]. Available: http:// members.aol.com/maestro12/web/evalform.html. [1998, April 20].

Johnston, A. (1997/98). The Internet pyramid. Learning and Leading With Technology, 25(4), 36-37.

Kearsley, G. (1994). Educational technology leadership perspectives. Englewood Cliffs, NJ: Educational Technology Publications.

Kern, H. (1997). Students' grass roots work goes global: The I*EARN Holocaust/Genocide Project (HGP). Journal of Online Learning, 9(1), 5-6.

Lever-Duffy, J. (1993). Multi-access education: A model for instructional delivery in the Information Age. paper presented at the Reinventing the Community College Conference.

Marcovitz, D. (1997). I Read it on the computer, it must be true: evaluating information from the Web. Learning and Leading with Technology, 25(3), 18-21.

Mehlinger, H. D. (1995). School reform in the information age. Indiana: Center for Excellence in Education.

Mergendoller, J. (1997, January 1997). Technology and learning: The research. Principal, 76, 12-14.

Microsoft Office 97 (Version Windows 4.0) [Computer Software]. (1997). Redmond WA: Microsoft Corporation.

Moore, D., Burton, J., Myers, R. (1996). Multiple-channel communication: The theoretical and research foundations of multimedia. In D. Jonassen (Ed.), Handbook of educational communications and technology: A project of the association for educational communications and technology (pp. 851-869). New York: Simon & Schuster Macmillan.

Moursund, D. (1996). Increasing your expertise as a problem solver: Some roles of computers. Eugene, OR: International Society for Technology in Education.

Moursund, D. (1998). Moore's Law. Learning and Leading with Technology, 25(6), 4-5.

Moursund, D. (1997/98). Professional development: An eight-level scale. Learning and Leading with Technology, 25(4), 4-5.

Negroponte, N. (1995). Being digital. New York,NY: Vintage.

Negroponte, N. (1997, December). Nation.1. Wired, 5, 306.

New York State Education Department (n.d., February 25, 1998). Curriculum Resource Guides on the Web, [on-line]. Available: http://www.nysed.gov/guides/. [1997, October 1].

November, A. (1997a). From technical boxes to student learning. [on-line] Available: http://www.edrenplanners.com/ articles/ boxes.htm/. [1997, February 5].

November, A. (1997b). Magic links-changing the focus of technology planning. Learning and Leading With Technology, 24, 54-56.

Papert, S. (1992). The children's machine: Rethinking school in the age of the computer. New York, NY: BasicBooks.

Ravitz, J., Lake, D. (1997). An authentic learning tool for teachers: The OII WWW Site Evaluation Form: Proceedings of the FSU/AECT Distance Education Conference, Tallahassee, FL. June 20-23, 1996. [on-line]. Available: http://nsn.bbn.com/webeval/ site1.htm. [1997, April 5].

Reed, W. (1996). Assessing the impact of computer-based writing instruction. Journal of research on computing in education, 28(4), 418-437.

Reigeluth, C. M. (1996). A new paradigm of ISD? Educational Technology, 13-19.

Rheingold, H. (1993). The virtual community. Reading: MA: Addison-Wesley.

Rhodes, L. (1995). Technology-driven systemic change. Learning and Leading With Technology, 23(3), 35-37.

Rhodes, L. (1996). Seeking new connections: Learning, technology, and systemic change. Learning and Leading With Technology, 23(8), 45-48.

Rose, M. (1995). Possible lives: The promise of public education in America. Boston: Houghton Mifflin.

Sandholtz, J & Ringstaff C. (1996) Technology-rich classrooms. In C. Fisher, D Dwyer, K. Yocam, (Eds.), Education and technology: Reflections on computing in classrooms. San Francisco: Apple Press.

Scrogan, L. (1993). Tools for change - restructuring technology in our schools - a guide for the educational decision maker: Institute for Effective Educational Practice.

Seels, B., Berry, L. Fullerton, K. Horn, L. (1996). Research on learning from television. In D. Jonassen (Ed.), Handbook of educational communications and technology: A project of the association for educational communications and technology (pp. 299-377). New York: Simon & Schuster Macmillan.

Shanker, A. (1997, Spring/Summer). The power of ideas: Al in his own words: A collection. [Special issue]. American Educator.

Shields, J. (1997). Brave new multimedia. Technology and Learning, 17(7), 37-39.

Snyder, T. (1994). Hypermedia and educators. Keynote address at National Educational Computing Conference, Boston, MA.

Solomon, G. S. S. (1995). Technology and professional development -10 tips to make it better. Learning and Leading With Technology, 23(38, 39, 70).

Thompson, A. Simonson, M. & Hargrave, C. (1996). Educational technology a review of the research second edition. Washington D.C.: The Association for Educational Communications and Technology.

Thornburg, D. (1996). Putting the web to work: Transforming education for the next century. U.S.A.: Starsong Publications.

U.S. Congress. (April, 1995). Teachers and Technology: Making the Connection. (Vol. 0TA-EHR-616). Washington, DC: U. S. Government Printing Office.

U. S. Department of Education. (1997). Building knowledge for a nation of learners: A framework for educational research. Washington D.C.: Office of Educational Research and Improvement.

Woolsey, K. (1996). Hope and joy in a rational world. In C. Fisher, D. Dwyer, K. Yocam (Eds.), Education and technology: Reflections on computing in classrooms. San Francisco: Apple Press.

APPENDIX A

Appendix A

Results: Information and Resource Questionnaire for Teachers (n=51)
(September, 1997)

Dear Colleagues,

The following survey will be used to help design a project for infusing technology into our school. Please respond thoughtfully; all results will be kept confidential. Thank you-- JoAnn Bing

19 Male

32 Female

1. I have access to a computer at home
35 always 4 almost always 2 sometimes 1 almost never 9 never.

2. I have access to a computer at school
31 always 10 almost always 6 sometimes 4 almost never 0 never.

3. I have access to the Internet at home
20 always 3 almost always 3 sometimes 4 almost never 21 never.

4. I have access to the Internet at school.
7 always 6 almost always 9 sometimes 17 almost never 12 never.

5. I frequent a local library
15 always 9 almost always 22 sometimes 4 almost never 1 never.

6. I frequent the school library
9 always 11 almost always 25 sometimes 5 almost never 1 never.

If you have answered never to #5 and #6, please skip to question 15.

When patronizing a library, I frequently use the:

7. electronic card catalog
13 always 18 almost always 8 sometimes 5 almost never 7 never.

8. *Readers' Guide to Periodical Literature* (print)
0 always 3 almost always 19 sometimes 17 almost never 12 never.

9. specialized print encyclopedias (scientific, historical, etc.)

1 always 1 almost always 22 sometimes 14 almost never 13 never.

10. specialized biographical sources (e.g. *Current Biography*)

0 always 3 almost always 18 sometimes 14 almost never 16 never.

11. I use the local or school library's resources to research and retrieve various computerized data-bases (magazines, newspapers, etc.)
3 always 7 almost always 11 sometimes 15 almost never 15 never.

12. If both print resources and computerized resources were available in the library. I would prefer to use

27 print resource (book. encyclopedia. etc.).
24 computerized source (CD ROM products. Internet access).

13. I use the local or school library's computer resources to access the Internet
0 always 1 almost always 6 sometimes 10 almost never 34 never.

14. I am comfortable using new library resources (OPAC's . CD ROM's. etc.) well
[OPAC =ON LINE PUBLIC ACCESS CATALOG]
4 always 7 almost always 16 sometimes 13 almost never 11 never.

15. I allow students to cite Internet sources in papers and for projects
20 always 6 almost always 9 sometimes 4 almost never 12 never.

16. I use district technology facilities (computer labs. computer mini labs. t.v. studio)
4 always 8 almost always 19 sometimes 10 almost never 10 never.

17. At home. I can use a computer for word processing.
33 always 6 almost always 4 sometimes 2 almost never 6 never.

18. At school. I can use a computer for word processing.
29 always 8 almost always 8 sometimes 3 almost never 3 never.

19. To prepare written work. I use word processing
31 always 14 almost always 4 sometimes 0 almost never 2 never.

20. To edit and revise word processing. I use cutting and pasting operations.
15 always 9 almost always 14 sometimes 4 almost never 9 never.

21. I keep electronic copies of my work in files on a computer disk or a hard drive
28 always 13 almost always 2 sometimes 2 almost never 6 never.

22. I use my home computer to access on-line resources
9 always 6 almost always 11 sometimes 4 almost never 21 never.

To prepare classroom presentations AT HOME I've used

23. cam-corders
0 always 0 almost always 12 sometimes 6 almost never 33 never.

24. digital cameras
0 always 0 almost always 3 sometimes 1 almost never 47 never.

25. CD-ROM
2 always 1 almost always 15 sometimes 6 almost never 27 never.

26. computers
11 always 14 almost always 13 sometimes 2 almost never 11 never.

27. the Internet
1 always 2 almost always 14 sometimes 5 almost never 29 never.

To prepare classroom presentations AT SCHOOL I've used

28. cam-corders
3 always 1 almost always 9 sometimes 8 almost never 30 never.

29. digital cameras
0 always 1 almost always 2 sometimes 2 almost never 46 never.

30. CD-ROM
1 always 2 almost always 8 sometimes 7 almost never 33 never.

31. computers
8 always 15 almost always 12 sometimes 3 almost never 13 never.

32. the Internet
1 always 1 almost always 8 sometimes 10 almost never 31 never.

33. I use electronic technology to find information
1 always 10 almost always 29 sometimes 7 almost never 4 never.

34. I use electronic technology to present information
0 always 7 almost always 20 sometimes 11 almost never 13 never.

35. I use computers to facilitate personal management tasks, i.e. desktop publishing, electronic gradebooks, grade reporting, banking, etc.
5 always 9 almost always 17 sometimes 6 almost never 14 never.

36. I use computers to facilitate lesson design or presentation.
1 always 10 almost always 22 sometimes 5 almost never 13 never.

37. I find training in technology use personally helpful
10 always 24 almost always 13 sometimes 2 almost never 2 never.

38. I see a need for training in technology use
19 always 22 almost always 8 sometimes 2 almost never 0 never.

NEEDS ASSESSMENT
Please respond to each of the following:

39. I have access to a computer in:
16 my classroom 6 the library 2 a department office 1 a technology lab or minilab in my building 4 .

40. I have access to a computer with a CD-ROM drive in:
9 my classroom 10 the library 5 a department office 2 a technology lab or minilab in my building7 .

41. I have access to a multimedia computer in:
7 my classroom 13 the library 4 a department office 4 a technology lab or minilab in my building 8 .

42. I have access to data-bases stored on CD-ROM for electronic retrieval in :
2 my classroom 16 the library 1 a department office 3 a technology lab or minilab in my building 5 .

43. I have access to a cam-corder in:
_____0____my classroom__11__the library__1____a department office___10___a technology lab or minilab in my building 4__.

44. I have access to a digital camera in:
_____0____my classroom___8__the library__1____a department office____4__a lab or minilab in my building 5__.

45. I have access to the Internet in:
_____1____my classroom _18___the library____2__a department office___4___a technology lab or minilab in my building 9__.

46. I have access to the district's internal email system in:
_____12____my classroom___9__the library_____5_a department office___0___a technology lab or minilab in my building 2__.

47. I have an account on the district's email system.
____9__yes ___42____no.

APPENDIX B

Appendix B

Results: Information and Resource Questionnaire for Students n=457(September, 1997)
The following survey will be used to help design a project for infusing technology into our school. Please use the Scan-Tron card and pencil provided to respond thoughtfully. Thank you-- Ms. Bing

1______**Grade (63=7, 82=8, 75=9, 78=10, 79=11, 80=12)**

2______**Gender (A=Male, B=Female)**

3. I have access to a computer at home
308 always 67 almost always 27 sometimes 10 almost never 45 never.

4. I have access to a computer at school
47 always 97 almost always 233 sometimes 65 almost never 15 never.

5. I have access to the Internet at home
178 always 72 almost always 22 sometimes 32 almost never 153 never.

6. I have access to the Internet at school.
18 always 36 almost always 110 sometimes 100 almost never 193 never.

7. I go to a local library
39 always 82 almost always 245 sometimes 73 almost never 18 never.

8. I go to the school library
24 always 47 almost always 266 sometimes 90 almost never 30 never.

To do research, I use the following school library resources:

9. electronic card catalog
113 always 135 almost always 91 sometimes 59 almost never 59 never.

10. *Readers' Guide to Periodical Literature* (print)
2 always 18 almost always 67 sometimes 87 almost never 283 never.

11. specialized print encyclopedias (scientific, historical, etc.)
34 always 97 almost always 167 sometimes 86 almost never 73 never.

12. specialized biographical sources (e.g. *Current Biography*)
15 always 48 almost always 151 sometimes 123 almost never 120 never.

13. I use our school library's resources to research and retrieve various computerized data-bases (Infotrac, newspapers, etc.)
21 always 76 almost always 177 sometimes 82 almost never 101 never.

14. If both print resources and computerized resources were available in our library, I would prefer to use
129 print resource (book, encyclopedia, etc.). **DARKEN A**
314 computerized source (CD-ROM products, Internet access). **DARKEN B**

15. I use our school library's computer resources to access the Internet
4 always 12 almost always 78 sometimes 118 almost never 245 never.

16. I've cited Internet sources in papers and projects
27 always 57 almost always 172 sometimes 98 almost never 103 never.

17. I can use a computer at home for word processing

__311__ always __59__ almost always __37__ sometimes __12__ almost never __38__ never.

18. I can use a computer at school for word processing
__69__ always __105__ almost always __148__ sometimes __90__ almost never __45__ never.

19. To prepare written assignments, I use word processing
__130__ always __137__ almost always __128__ sometimes __34__ almost never __28__ never.

20. To edit and revise word processed written assignments, I use cutting and pasting operations.
__73__ always __71__ almost always __160__ sometimes __69__ almost never __84__ never.

21. I keep electronic copies of my work in files on a computer disk or a hard drive
__205__ always __90__ almost always __77__ sometimes __32__ almost never __53__ never.

22. I use my home computer to access on-line resources
__103__ always __78__ almost always __87__ sometimes __45__ almost never __144__ never.

To prepare school projects AT HOME I've used:

23. cam-corders
__9__ always __12__ almost always. __152__ sometimes __103__ almost never __189__ never.

24. digital cameras
__8__ always __13__ almost always __95__ sometimes __77__ almost never __253__ never.

25. CD-ROM
__69__ always __97__ almost always __100__ sometimes __34__ almost never __130__ never.

26. computers
__215__ always __108__ almost always __58__ sometimes __19__ almost never __44__ never.

To prepare or to present school projects AT SCHOOL I've used:

27. cam-corders
__10__ always __16__ almost always __89__ sometimes __99__ almost never __236__ never.

28. digital cameras
__7__ always __9__ almost always __59__ sometimes __69__ almost never __303__ never.

29. CD-ROM
__28__ always __40__ almost always __102__ sometimes __88__ almost never __182__ never.

30. I use technology to learn information
__71__ always __165__ almost always __161__ sometimes __34__ almost never __20__ never.

31. I use technology to present information
__49__ always __94__ almost always __188__ sometimes __75__ almost never __48__ never.

APPENDIX C

Appendix C

ON-LINE SURVEY RESULTS

Surveys returned:
4 Administrators   14 High School   8 Middle School   15 Elementary (7 grades 4-5 8 grades preK-3)
Total of 41 responses district wide.

Administrative responses identify 5-9 people who it was felt could benefit from having it available.
Currently only one administrator has and uses on-line services.

14 people have and use on-line services at home. Most use AOL, two have Compuserve. With one exception all the school accounts are through Li.Net. It appears that there are 4-5 Li.Net accounts on the Vandermeulen Campus.

21 teachers district wide would use on-line in the classroom. Comments ranged from "I'd give it a try" to "When will it be installed?", with the majority anxious to try, have and use on-line services.

From the survey it appears use of on-line services in school occurs in the Middle School and High School. Apparently 7-8 teachers are actually on-line with the majority sharing a phone line with someone else. The 3 who go through the switchboard when on-line find it the most difficult to function. We did not ask how many students were on-line in school as a result. For example, in the library, some days 7-8 individual students or an entire class might utilize the connection.

Most people use a service one hour or less a day. Two high school locations are in the 2-4 hour range.

Comments:
Need more lines not going through the switchboard
"Put it in my room and I'll share with others" (Prek-3)
"It is not available yet, I wish it was" (Prek-3)
One person does not like Li.Net services
"On-line would keep us current"
Have it at home, uses it, would like access in school (M.S.)

General Computer Comments:
I would love a computer (k-5 special)
We need more computers (grade4-5)
Writing Center needs more computers, all compatible, networked with a printer, etc (H.S.)
Wants a power Mac (H.S.)
General request for more inservice and opportunities to learn to use what they have

BEST COPY AVAILABLE

APPENDIX D

Appendix D

TEACHERS-HELPING-TEACHERS

MID POINT EVALUATION FORM (N=16)

(March, 1998)

Dear Colleagues,

Since we only have two more sessions, it's important that we use the time to best accommodate your needs. Here are the original workshop objectives rephrased for your evaluation. At this point in time, consider your progress toward achievement of each of them. Rate yourself before deciding upon which areas you'd most like to focus. Please use the scan-tron card and a #2 pencil to record your progress evaluations. You need not put your name on the card. Please return it to me via school mail by March 27. Thank you—JoAnn Bing

Objectives

Teachers will receive training and support to utilize the World Wide Web as part of their instructional activities.

1. I have received training and support to utilize the World Wide Web as part of my instructional activities.
(a) 6___ strongly agree (b) 5__agree (c) 3__unsure (d) 1_disagree (e) 1_strongly disagree
2. I am able to utilize the World Wide Web as part of my instructional activities.
(a) 2__strongly agree (b) 9__agree (c) 4_unsure (d) 0_disagree (e) 1_strongly disagree
3. I have utilized the World Wide Web as part of my instructional activities.
(a) 4__strongly agree (b) 5__agree (c) 2__unsure (d) 3__disagree (e) 2_strongly disagree

Participants will use the electronic information resources of the library media center in a classroom related activity.

4. I have received training and support to use the electronic information resources of the library media center in a classroom related activity.
(a) 7_strongly agree (b) 4__agree (c) 3__unsure (d) 1_disagree (e) 1_strongly disagree
5. I am able to utilize the electronic information resources of the library media center in a classroom related activity.
(a) 3_strongly agree (b) 8_agree (c) 3__unsure (d) 1_disagree (e) 1_strongly disagree
6. I have utilized the electronic information resources of the library media center in a classroom related activity.
(a) 6_strongly agree (b) 3_agree (c) 3_unsure (d) 3_disagree (e) 1_strongly disagree

Teachers will receive training and support to develop web pages which are integrated with their classroom activities and training and support to post their pages on the district web pages.

7. I have received training and support to develop web pages which are integrated with my classroom activities and training and support to post these pages on the district web pages.

(a) 7_strongly agree (b) 7_agree (c) 1_unsure (d) 1_disagree (e) 0_strongly disagree
8. I am able to develop web pages which are integrated with my classroom activities and have received training and support to post these pages on the district web pages.
(a) 7_strongly agree (b) 6_agree (c) 2_unsure (d) 1_disagree (e) 0_strongly disagree
9. I have developed web pages which are integrated with my classroom activities and have received training and support to post these pages on the district web pages.
(a) 5_strongly agree (b) 2_agree (c) 4_unsure (d) 4_disagree (e) 1_strongly disagree

Participants will create and post a web page on the district pages during the spring semester of '98.

10. I have finished creating and posting a web page on the district pages.
(a) 7_yes (b) 9_no

Teachers will receive training and support to utilize technology and software in their record and grade keeping activities.

11. I have received training and support to utilize technology and software in my record and grade keeping activities.
(a) 8_strongly agree (b) 4_agree (c) 3_unsure (d) 1_disagree (e) 0_strongly disagree
12 I have utilized technology and software in my record and grade keeping activities.
(a) 9_yes (b) 7_no

Participants who teach grades 7-12 will learn how to submit their grades and progress reports without using bubble sheets.

13, I have learned how to submit grades and progress reports without using bubble sheets.
(a) 9_yes (b) 2_no (c) 5_ does not apply
14. I have submitted grades and/or progress reports without using bubble sheets.
(a) 3_yes (b) 8_no 5_does not apply

Teachers will receive training and support to use the resources of the school TV studio.

15. I have received training and support to use the resources of the school TV studio.
(a)4_strongly agree (b) 4_agree (c) 4_unsure (d) 3_disagree (e) 1_strongly disagree

Participants will use the resources of the school TV studio in a classroom related activity.

16. I have used the resources of the school TV studio in a classroom related activity.
(a) 6_yes (b) 10_no
Please rate the activity you would most like to devote time on with an "a", your second choice"b", your third choice "c", your fourth choice"d" and your last choice "e".

17. (a) 9_ (b) 5_ (c) 1_ (d) 0_ (e) 1_ World Wide Web resources
18(a) 2_ (b) 6_ (c) 4_ (d) 3_ (e) 1_ library media center information resources
19(a) 1_ (b) 3_ (c) 6_ (d) 6_ (e) 0_ web page development
20.(a) 3_ (b) 2_ (c) 3_ (d) 2_ (e) 6_ technology and software for record keeping and grades
21. (a) 2_ (b) 3_ (c) 1_ (d) 3_ (e)7_ television studio

APPENDIX E

Appendix E

Teachers-Helping-Teachers
Summative Evaluation

May, 1998

Dear Colleagues.
Thank you so much for participating in this effort. Here are the original objectives rephrased for you to reflect and comment upon. Please put your responses to the numbered questions on the scan-tron and answer the others on these sheets.
a=strongly agree, b=agree, c=unsure, d=disagree, e=strongly disagree

Objectives
Teachers will receive training and support to utilize the World Wide Web as part of their instructional activities.

1. I have received training and support to utilize the World Wide Web as part of my instructional activites.
9__strongly agree 3_____agree 0____unsure 0___disagree 0_____strongly disagree
2. I am able to utilize the World Wide Web as part of my instructional activities.
7__ strongly agree 4_____agree 1___unsure 0___disagree 0___strongly disagree
3. I have utilized the World Wide Web as part of my instructional activities.
5___strongly agree 4___agree 2___unsure 1___disagree 0___strongly disagree

Please comment on aspects of this segment of Teachers-Helping-Teachers that you liked and/or found helpful.

Please comment on aspects of this segment that you disliked and/or found unhelpful.

Suggestions for the future???

Participants will use the electronic information resources of the library media center in a classroom related activity.
4. I have received training and support to use the electronic information resources of the library media center in a classroom related activity.
5___strongly agree 6___agree 0___unsure 0___disagree 1___strongly disagree
5. I am able to utilize the electronic information resources of the library media center in a classroom related activity.
2___strongly agree 7___agree 1___unsure 1___disagree 1___strongly disagree
6. I have utilized the electronic information resources of the library media center in a classroom related activity.
4___strongly agree 4___agree 1___unsure 2___disagree 1___strongly disagree

Please comment on aspects of this segment of Teachers-Helping-Teachers that you liked and/or found helpful.

Please comment on aspects of this segment that you disliked and/or found unhelpful.

Suggestions for the future???

Teachers will receive training and support to develop web pages which are integrated with their classroom activities and training and support to post their pages on the district web pages.

7. I have received training and support to to develop web pages which are integrated with my classroom activities and training and support to post these pages on the district web pages.
6___strongly agree 5___agree 1___unsure 0___disagree 0___strongly disagree
8. I am able to to develop web pages which are integrated with my classroom activities and have received training and support to post these pages on the district web pages.
3___strongly agree 4___agree 5___unsure 0___disagree 0___strongly disagree
9. I have developed web pages which are integrated with my classroom activities and have received training and support to post these pages on the district web pages.
4___strongly agree 3___agree 5___unsure 0___disagree 0___strongly disagree
Participants will create and post a web page on the district pages during the spring semester of '98.
10. I have finished creating and posting a web page on the district pages.
a11___yes b1___no
Please comment on aspects of this segment of Teachers-Helping-Teachers that you liked and/or found helpful.

Please comment on aspects of this segment that you disliked and/or found unhelpful.

Suggestions for the future???

Teachers will receive training and support to utilize technology and software in their record and grade keeping activities.

11. I have received training and support to utilize technology and software in my record and grade keeping activities. (elementary teachers skip this one)
6___strongly agree 6___agree 0___unsure 0___disagree 0___strongly disagree
12 I have utilized technololgy and software in my record and grade keeping activities.
5___yes 5___no 2___does not apply
Participants who teach grades 7-12 will learn how to submit their grades and progress reports without using bubble sheets.
13, I have learned how to submit grades and progress reports without using bubble sheets.
8___yes 2___no 2___does not apply
14. I have submitted grades and progress reports without using bubble sheets.
4___yes 7___no 1___does not apply
Please comment on aspects of this segment of Teachers-Helping-Teachers that you liked and/or found helpful.

Please comment on aspects of this segment that you disliked and/or found unhelpful.

Suggestions for the future???

Teachers will receive training and support to use the resources of the school TV studio.
15. I have received training and support to use the resources of the school TV studio in a classroom related activity.
3___strongly agree 5___agree 2___unsure 2___disagree 0___strongly disagree
16. I am able to use the resources of the school TV studio in a classroom related activity.
2___strongly agree 5___agree 2___unsure 2___disagree 1___strongly disagree
17. I have utilized the resouces of the school TV studio in a classroom related activity.
3___strongly agree 4___agree 0___unsure 4___disagree 1___strongly disagree
Please comment on aspects of this segment of Teachers-Helping-Teachers that you liked and/or found helpful.

Please comment on aspects of this segment that you disliked and/or found unhelpful.

Suggestions for the future???

Please add any final suggestions or coments about future **Web Wanderings**, district teacher technology training, peer mentoring or anything else that occurs to you. Thanks again!!

APPENDIX F

Appendix F

RESULTS: INFORMATION AND RESOURCE QUESTIONNAIRE FOR TEACHERS (N=35)

(June 1998)

Dear Colleagues,

Last fall, many of you took the time to answer the following survey to help design a project for infusing technology into our schools. I am sending you the same questons to collect data at the end of the school year to assess progress to date. Thank you for helping me to finish gathering information at such a busy time-- JoAnn Bing

9 Male

26 Female

1. I have access to a computer at home
22 always 7 almost always 0 sometimes 1 almost never 5 never.

2. I have access to a computer at school
20 always 8 almost always 3 sometimes 2 almost never 2 never.

3. I have access to the Internet at home
19 always 3 almost always 4 sometimes 0 almost never 9 never.

4. I have access to the Internet at school.
9 always 4 almost always 11 sometimes 4 almost never 6 never.

5. I frequent a local library
13 always 3 almost always 17 sometimes 1 almost never 1 never.

6. I frequent the school library
13 always 6 almost always 12 sometimes 2 almost never 1 never.

If you have answered never to #5 and #6, please skip to question 15.

When patronizing a library, I frequently use the:

7. electronic card catalog
13 always 7 almost always 9 sometimes 3 almost never 2 never.

8. *Readers' Guide to Periodical Literature* (print)
0 always 6 almost always 14 sometimes 10 almost never 4 never.

9. specialized print encyclopedias (scientific, historical, etc.)

0 always 3 almost always 17 sometimes 10 almost never 4 never.

10. specialized biographical sources (e.g. *Current Biography*)

_0_ always _2_ almost always _15_ sometimes _11_ almost never _16_ never.

11. I use the local or school library's resources to research and retrieve various computerized data-bases (magazines, newspapers, etc.)
_3_ always _7_ almost always _11_ sometimes _15_ almost never _6_ never.

12. If both print resources and computerized resources were available in the library, I would prefer to use
_18_ print resource (book, encyclopedia, etc.).
_17_ computerized source (CD ROM products, Internet access).

13. I use the local or school library's computer resources to access the Internet
_3_ always _3_ almost always _7_ sometimes _8_ almost never _13_ never.

14. I am comfortable using new library resources (OPAC's , CD ROM's, etc.) well
[OPAC =ON LINE PUBLIC ACCESS CATALOG]
_2_ always _2_ almost always _13_ sometimes _8_ almost never _6_ never.

15. I allow students to cite Internet sources in papers and for projects
_14_ always _7_ almost always _6_ sometimes _3_ almost never _5_ never.

16. I use district technology facilities (computer labs, computer mini labs, t.v. studio)
_3_ always _4_ almost always _17_ sometimes _4_ almost never _4_ never.

17. At home, I can use a computer for word processing.
_30_ always _1_ almost always _1_ sometimes _1_ almost never _2_ never.

18. At school, I can use a computer for word processing.
_24_ always _3_ almost always _3_ sometimes _2_ almost never _2_ never.

19. To prepare written work, I use word processing
_23_ always _7_ almost always _3_ sometimes _0_ almost never _2_ never.

20. To edit and revise word processing, I use cutting and pasting operations.
_17_ always _4_ almost always _4_ sometimes _5_ almost never _5_ never.

21. I keep electronic copies of my work in files on a computer disk or a hard drive
_21_ always _8_ almost always _3_ sometimes _0_ almost never _3_ never.

22. I use my home computer to access on-line resources
_12_ always _3_ almost always _7_ sometimes _3_ almost never _10_ never.

To prepare classroom presentations AT HOME I've used

23. cam-corders
_1_ always _1_ almost always _6_ sometimes _7_ almost never _21_ never.

24. digital cameras
_1_ always _1_ almost always _0_ sometimes _2_ almost never _31_ never.

25. CD-ROM
_2_ always _2_ almost always _10_ sometimes _4_ almost never _17_ never.

26. computers
9 always 11 almost always 8 sometimes 2 almost never 4 never.

27. the Internet
3 always 3 almost always 15 sometimes 5 almost never 10 never.

To prepare classroom presentations AT SCHOOL I've used

28. cam-corders
2 always 3 almost always 5 sometimes 4 almost never 21 never.

29. digital cameras
1 always 1 almost always 5 sometimes 2 almost never 26 never.

30. CD-ROM
1 always 3 almost always 11 sometimes 1 almost never 9 never.

31. computers
10 always 6 almost always 13 sometimes 2 almost never 4 never.

32. the Internet
3 always 2 almost always 9 sometimes 6 almost never 15 never.

33. I use electronic technology to find information
3 always 10 almost always 17 sometimes 3 almost never 2 never.

34. I use electronic technology to present information
2 always 4 almost always 11 sometimes 9 almost never 8 never.

35. I use computers to facilitate personal management tasks. i.e. desktop publishing. electronic gradebooks. grade reporting, banking, etc.
3 always 7 almost always 7 sometimes 6 almost never 12 never.

36. I use computers to facilitate lesson design or presentation.
2 always 6 almost always 15 sometimes 4 almost never 8 never.

37. I find training in technology use personally helpful
14 always 10 almost always 9 sometimes 1 almost never 1 never.

38. I see a need for training in technology use
10 always 15 almost always 6 sometimes 3 almost never 1 never.

NEEDS ASSESSMENT
Please respond to each of the following:

39. I have access to a computer in:
8 my classroom 4 the library 1 a department office ______ a technology lab or minilab in my building 4.

40. I have access to a computer with a CD-ROM drive in:
9 my classroom 7 the library 1 a department office 2 a technology lab or minilab in my building 7.

41. I have access to a multimedia computer in:
_____7____my classroom_13___the library____4__a department office___4___a technology lab or minilab in my building 7__.

42. I have access to data-bases stored on CD-ROM for electronic retrieval in :
______3___my classroom___13__the library____2__a department office_1____a technology lab or minilab in my building 3__.

43. I have access to a cam-corder in:
_____1____my classroom__8__the library__1____a department office____10___a technology lab or minilab in my building 2__.

44. I have access to a digital camera in:
_____1____my classroom____1__the library__0____a department office____6__a lab or minilab in my building 4__.

45. I have access to the Internet in:
_____3____my classroom__18___the library______a department office___2___a technology lab or minilab in my building 4__.

46. I have access to the district's internal email system in:
_____4____my classroom___8__the library_____3_a department office___2___a technology lab or minilab in my building 1__.

47. I have an account on the district's email system.
____12__yes ___21____no.